#11.4

SMALL SCALE WASTE MANAGEMENT PROJECT

Legal, Planning and Economic Considerations of On-site Sewerage Systems

by

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1974

UNIVERSITY OF WISCONSIN - MADISON
College of Agricultrual & Life Sciences
Agricultural Engineering
Food Research Institute
Soil Science
School of Natural Resources
Environmental Resources Center
College of Engineering
Civil & Environmental Engineering

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LEGAL, PLANNING AND ECONOMIC CONSIDERATIONS OF ON-SITE SEWERAGE SYSTEMS[1/]

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While there may be many operational and technological differences between the conventional septic tank-soil absorption system and other more innovative systems, the underlying premise of this paper assumes that from a legal viewpoint the administration and regulation of all systems is similar. Thus, if present regulatory schemes used by the various states and counties today can be improved, these improvements will bring about better regulation of both types of systems. After a discussion of the history, usage, problems, and phases in the life of an on-site system, this paper offers general changes to improve the regulation of both septic and innovative systems.

I. History and Magnitude of On-Site Sewerage System Usage

The septic tank and subsurface soil absorption field has for many years been the most commonly-used method for on-site treatment and disposal of domestic sewage. The performance record, and in fact even the use of septic systems, has been questioned by regulatory authorities who in many cases have a bias against them. Those responsible for regulation have had little data available upon which to evaluate either the performance record or the reasons the septic systems fail. Improper siting, installation and design as well as infrequent maintenance have all been given as reasons for the failure of septic systems, but there is little documentation available. Their performance record is not known exactly with one source estimating the number of failing systems at about 50 percent (Patterson, 1971), while another often cited source reporting high system survival rates of over 90 percent for 20 year old systems (Clayton, 1974). The range of these estimates points out the need for sanitary surveys to enable regulatory authorities to determine actual performance records as well as the causes of failure.

[1/]The author expresses sincere appreciation to Stephen C. Smith, Associate Dean, School of Natural Resources, College of Agricultural and Life Sciences, University of Wisconsin, Madison, Wisconsin, for his helpful suggestions and thorough review of this paper. Also the author appreciated the review of this paper by Dr. W.C. Boyle, Professor of Sanitary Engineering and Dr. Johannes Bouma, Associate Professor of Soil Science, University of Wisconsin, Madison.

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Today, methods and systems other than the septic tank system are continuously being developed and promoted and the performance records of these systems are questioned as well (Otis, et. al., 1973). Many regulatory authorities are in favor of limiting the use of these more innovative systems to an even greater degree than septic systems. Thus, it can be seen that both the septic systems and the more innovative systems are under severe question today.

The septic tank was developed and patented in England in the 1880's. The septic tank was used in this country before the turn of the century, however, its use became widespread during the decade after World War II. The suburban housing boom of the 1950's produced a major demand for a method of treating and disposing of home sewage in areas where servicing by municipally owned central systems was not economically feasible. This demand was met by the septic tank-soil absorption system. During the 1960's, the dramatic increase in recreational second homes added another demand for septic systems to handle wastes in non-urban and often remote areas (Beatty, 1974).

As of 1971, there were an estimated 13 million private septic systems in use in the United States, serving approximately 50 million people. The use of these private systems has been increasing at a rate of about one-half a million new systems per year (Patterson, et. al., 1971). These figures do not include the more innovative on-site systems nor the non-existent or direct discharge systems used by many non-urban residents.

A large number of people still do not have satisfactory waste systems. About five to ten million households in America still use privies or directly discharge their untreated sewage (Morgan, 1973). Also, the number of homes in the United States which are served by failing septic systems is difficult to estimate due to the lack of a program of comprehensive rural sanitary surveys.

The approach taken by most regulatory authorities in the field of rural wastewater treatment and disposal has been to require each homeowner to install some type of on-site system. These systems are designed to keep pathogens and nutrients (to some degree) from surface and groundwaters, thus protecting the homeowner's health and the groundwater. It must be realized that, of course, groundwater and public health problems overlap here in that most rural homeowners rely upon the groundwater as a water supply. One source stated that 95 percent of the domestic water used in rural America is from groundwater sources (Morgan, 1973). An alternate approach to the rural waste water treatment question would be to simply isolate the water supply, insure that it is adequate from public health standpoints, and not to worry about the groundwater. That is to say that the second approach could place less emphasis on the actual method of on-site waste treatment and disposal because of increased emphasis placed on assuring the supply of safe water for each family. Thus, the difference between these two alternative approaches turns on the policy question of whether the regulatory agencies shall have as a second objective, aside from the protection of public health, the protection of groundwater. It will be assumed in this paper that the first approach is the approach taken by most regulatory agencies.

II. Problems Arising Due to Use and Misuse of On-Site Sewerage Systems

First, the threat to public health due to water-borne diseases is generally the major problem raised when discussing the attributes and disadvantages of on-site sewerage systems. The absence of water-borne pathogens is one criterion of good water quality. Typically, those individuals who

supply their own water have the highest risk of water-borne disease. In the United States, from 1961 to 1970 there were a total of 128 known outbreaks of water-borne disease (defined as at least two reported cases) attributed to drinking water in this period which caused about 46,000 illnesses and 20 deaths (Craun, 1973). Ninety-four of these outbreaks occurred in private water supplies and the majority of these outbreaks were classified as gastro-enteritis. This same source compiled outbreak data for the 25 year period of 1946 to 1970 and concluded that 71 percent of the outbreaks (of a total of 358) occurred in private water supplies. It is important to note that many outbreaks of water-borne illness go unreported, so that the true incidence of disease may be assumed to be much higher.

Disease outbreaks could be drastically reduced by eliminating the travel of pathogens into water supplies. It has been argued that improper siting and design of the on-site system in the initial installation phase and failing systems at the end of their life cycle are the major sources of contamination. For this reason, these systems pose a potential threat to public health and many health officials have adopted the attitude that the use of on-site systems is to be generally discouraged -- seeking replacement where possible with central systems.

Second, another potential problem associated with on-site systems is their inability to remove potentially troublesome chemicals found in the wastewaters (typically, nitrogen and phosphate, both possibly present in several forms). These chemicals represent both a potential public health threat (i.e., nitrates causing infant methemoglobinemia) and a source of (undesirable) nutrients affecting both surface and groundwaters. There are two stages in the life cycle of on-site systems where this problem may occur. The first is due to improper location, siting, and design of the initial installation of the system. The second time of concern occurs at the end of the life cycle of the system when it has failed. Either improper siting or a failed system may result in contamination of surface or groundwaters with unwanted chemicals.

Neither the public health aspects nor the contamination of surface or groundwaters will be discussed in detail here; however, it should be noted that since 1945 about 2,000 cases, including fatal poisonings, of methemoglobinemia have been reported worldwide (Shuval, 1970). Further note that there are many other chemicals which might occur in wastewaters but they are not discussed here, either.

Third, most on-site systems have the attendant problem of limiting development. On-site systems which rely on soil for final disposal function properly only if located on suitable sites. In many places in the United States, suitable sites for on-site soil disposal are not available. In those jurisdictions which have a good administrative program of limiting installations to only suited sites, the resulting limited development has been referred to by some as de facto zoning. That is the siting requirements necessary for soil disposal tend to limit the amount of land available for development. Many jurisdictions have, in the past, relied on these requirements to provide them with a means of land use control. As innovative systems, which do not have as stringent siting requirements or do not rely on the soil for disposal become more widely accepted, this technique of land use control will be lost.

This problem of limiting development arises only at the initial or first phase in the life cycle of an on-site system. However, the magnitude of this problem is quite large. One source estimated that about 68 percent of the United States is unsuited for the average conventional soil disposal system (Morgan, 1973). Thus, the potential for a problem of limiting development is great, especially as more and more jurisdictions improve their programs of limiting installations to only suited sites.

Fourth, economic and financial hardship problems often arise when on-site systems are employed. Again, these problems generally occur during the initial phase in the life of an on-site system; however, these same type problems may occur in the failure or final phase in the life cycle. A typical example of this problem arises when the homeowner, after purchasing his site, discovers that it is unsuited for an on-site system. Several things may occur, first, the value of his lot and home, if already built, is greatly diminished. Second, he may plead financial hardship to the regulatory authorities in an effort to receive approval to install the system despite the lack of suited soil. This same type problem may also occur when an existing homeowner's system fails. He, of course, will have a much stronger financial hardship argument to raise if he is unable to find suitable soil on his lot; because very few regulatory authorities will ever require a homeowner to vacate his home due to the lack of a suitable site for replacement of his system. Of course, if the homeowner prevails, the installation of systems on unsuited sites may cause the public health and chemical problems as discussed above.

III. Three Phases in the Life of an On-Site System

The three phases in the life cycle of an on-site system are the initial installation phase, the maintenance phase, and the failure phase. The four problems discussed in the previous section may arise in one or more of these three phases; however, a good administrative program is one which regulates these three phases, thus limiting or preventing the occurrence of these problems.

First, the initial installation phase consists of proper siting and design requirements and proper construction of the on-site system. Through proper siting, installation, and design controls, the attendant problems of public health, chemical addition to the surface and groundwater and economic hardship problems may be avoided. For this reason, a good regulatory program must impose siting and design requirements at this initial phase.

Second, the second phase in the life of any on-site system is that of operation and maintenance. The problems of public health and chemical addition to the surface and groundwater may occur if the regulatory program lacks control over proper operation and maintenance. While there are very few operational or maintenance requirements for a septic system, some of the more innovative systems have more extensive requirements. Whether the system's operation and maintenance requirements are straightforward or elaborate, a good regulatory program should impose controls at this second phase in the life cycle.

Third, the third phase occurs when a system fails. This phase involves both the detection of the failure and the necessary subsequent actions taken (repair or abandonment). This is the most difficult phase to regulate; however, the problems of public health, chemical addition to the wastewaters and economic and financial hardships may be attenuated or avoided by proper regulatory control at this phase.

IV. Spectrum of Regulatory Authority

By improving the regulation of the three phases in the life of an on-site system, the occurrence of the potential problems associated with both septic or more innovative systems can be prevented. However, before listing suggested improvements, it is necessary to consider the spectrum of different regulatory schemes that are used in the 50 states.

The United States consists of 51 separate jurisdictions (the urban District of Columbia is omitted) consisting of the 50 states and the federal government. Little federal regulatory authority has been used against on-site systems in the past; although small scale sewerage systems might fall within federal jurisdiction. This possibility will not be pursued; instead all the focus will be on the 50 states.

The regulatory schemes used in the 50 states comprise a spectrum ranging from no state or local regulation whatsoever to almost total regulation by the state of all on-site systems. For example, many states, including:

Alabama	New Hampshire
Colorado	New Mexico
Delaware	North Carolina
Hawaii	Oklahoma
Maryland	Pennsylvania
Massachusetts	Rhode Island
Missouri	South Dakota
Nevada	West Virginia

require a state permit for on-site systems and require a site inspection by the state agency (Patterson, et. al., 1971). This regulatory scheme is generally considered to be the most effective and thus is to be preferred.

However, at the opposite end of the spectrum, a few states have no regulation scheme either at the state or local level. Some of these states claim to perform an advisory service for the public by supplying information on system design. This information is only for public education and is not enforceable. Other states in this group will take regulatory action against on-site systems only in the case of proven water pollution.

Between these two extremes on the spectrum, some of the states such as:

Arizona	New York
Georgia	Ohio
Illinois	South Carolina
Indiana	Tennessee
Iowa	Texas
Nebraska	Utah

defer all the permit and inspection responsibilities to local health authorities either at the county or town level (Patterson, et.al., 1971). As a subset to this scheme, some of these states such as Ohio have adopted a state code of minimum standards and specifications for on-site systems (Anon, 1974). Thus, in states having adopted minimum standards, the local health authorities' codes and standards must be at least as stringent as the state codes.

Also, between these two extremes, some states divide the responsibilities, with the local authorities generally regulating the on-site systems serving isolated single family units and the state regulating all subdivisions and commercial installations. For example, the state of Wisconsin issues permits and inspects all systems which serve public buildings such as theaters, assembly halls, schools, apartment buildings, hotels, prisons, factories, mobile homes, camps and parks while the county authorities regulate all one and two family systems (Anon., 1969).

Not only do the regulatory schemes used by the 50 states vary, but so do the on-site system standards and specifications used in the various states. Many of the states have as the basis of their standards the U. S. Public Health Service publication, "Manual of Septic Tank Practice," Publication Number PHSP 526, 1957. However, many states and localities have diverged from this basic standard and some have standards and specifications quite different from the "Manual."

V. Suggested Improvements

Due to the spectrum of regulatory schemes used by the various states, the following suggested means of improving the regulation of on-site sewerage systems will not be applicable to all states and localities. Also, some of the suggestions may already be incorporated into the regulatory scheme in the jurisdiction of interest. Further, due to different state constitutional limitations and requirements, several of these suggestions may not be possible in all states. For example, county (and town) home rule powers may prevent the implementation of some of the suggestions. Also, many of these suggestions may require the enactment of enabling legislation.

These suggestions are discussed under the headings of the three phases in the life of an on-site system. Obviously, a suggested improvement may bring about improvements in more than one phase. In such situations, the suggestions are discussed in the phase where the most improvement might be effected. These suggestions deal first with the initial installation phase and then operation and maintenance and finally the existing failing system phase.

INITIAL INSTALLATION

State Permit Program. It is suspected that many local health authorities are subjected to local political pressure to approve the installation of systems on unsuited sites. Aside from direct political pressure, some local authorities have reported that their boards of appeal have been subject to pressures and consistently override denials by permitting installation on sites thought to be unsuited by the local authority. To avoid this undue pressure, it is suggested that those states which do not presently have a state permit program should adopt one. The chance for direct political pressures at the state level should be less than the local level and the resources should be greater, in that the state either has or can employ soils or other experienced personnel to evaluate site suitability.

State Plan Review and State Standards. As an alternative, it is suggested that states should adopt a mandatory plan review of all the on-site systems approved at the local level. This state review process would be conducted by the appropriate state authority and would prevent the use of systems on improper sites by countermanding local approval when required. As an alternative to plan review, it is suggested that the state enact a mandatory review of all local sanitary programs; and when a local program is found to be deficient, the state should impose a state program until the locality brings its program up to standards. The state would have to establish minimum standards for local programs including enforcement practices, staff requirements, employment practices, siting and installation inspection requirements, etc. Also, these standards could even set out design and siting requirements for on-site systems.

Uniform Citation and Complaint. States and localities not having a method of issuing citations for sanitary ordinance or code violations are urged to adopt such a system. The citation system is currently being used by building inspectors in several major American cities to "ticket" owners of buildings which violate local codes (Anon., 1970). Essentially the uniform citation is similar to a traffic complaint and the violator of the sanitary ordinance (homeowner or system installer) signs the citation and agrees to appear in court to enter his plea. This system cuts down on enforcement delays and permits the local or state health authority to issue citations for violations as he sees them at the time of the violation. This system is equally applicable to violations in the other two regulatory phases.

Small Claims Courts. Many states have small claims courts for cases involving an amount less than a given number of dollars. Usually, these courts follow an abbreviated, less formal procedure generally using printed forms. When seeking only fines or forfeitures, state and local authorities are urged to consider using these small claims courts to prosecute initial installation violations as well as all other sanitary ordinance and code violations. Generally, there is a smaller backlog of cases in these courts than in courts of general jurisdiction, thus the enforcement of sanitary violations can be accelerated. Note that special enabling language might be required in some states.

Civil Service Status. Many local regulatory officials and some state officials serve at the pleasure of those who appointed them to their jobs. It is assumed that this lack of job security has hindered vigorous application and enforcement of initial installation requirements as well as enforcement of the other phases of regulation. To give them the necessary job security to do a vigorous job of enforcing the sanitary requirements, especially the crucial siting requirements, local and state agencies are urged to seek a civil service program for these officials.

OPERATION AND MAINTENANCE

Septic Tank Maintenance Permit. This phase of on-site system regulation is often the most overlooked. States or local authorities are urged to adopt a maintenance permit program to assure that septic tanks will be inspected once in a given number of years (1, 2, or 3) and that the septage will be pumped when necessary. The program would require the licensing of the pumpers. The homeowner would be mailed a maintenance permit form and would be given say 60 days to have any licensed pumper inspect and, if required, pump his tank. The pumper would sign one portion of the homeowner's permit thereby certifying that he inspected (and pumped) the tank. The authorities would then have on file a certified statement that the tank was inspected on a given date. Then just prior to the expiration of the 1, 2, or 3 year period, a similar card would be sent to the homeowner to renew the permit by repeating the process. Of course, it would be unlawful for any owner to use his system unless he held a valid permit. Also, this maintenance program could be modified so as to apply to other more innovative on-site systems.

Conditional Sanitary Permit. As an alternative to the maintenance permit program, state and local authorities which issue sanitary permits for on-site systems can make these permits valid subject to the condition that inspection and pumping (if necessary) be performed every 1, 2, or 3 years. The enabling legislation or ordinances would have to be worded to make it unlawful for a system owner to use his system unless he had a valid sanitary permit and the permit would be valid only if the necessary inspections (and pumping) had been performed.

Location Filing Requirement. Many state and local authorities already require the filing of a plan of the proposed (or built) system. For those that do not, they are urged to impose the requirement that each system owner file an "as built" plan of his system, clearly referencing the location of the system manholes. Such a plan is invaluable when it becomes necessary to inspect or service the on-site system. It has been noted that many owners do not know the location of their systems and obviously this makes maintenance difficult. In an attempt to improve this phase of regulation, states and/or local authorities are urged to adopt this filing requirement and to establish a file for these plans and index them by street address, name of original owner, installer, and perhaps legal description.

FAILING SYSTEMS

Sanitary Surveys. Detection of the failing system is one of the most important aspects of this final regulatory phase. If state and local authorities do not already have the authority and funding to perform sanitary surveys, they are urged to obtain them. The large staff commitment and the expense of such surveys are recognized; but these are justified as surveys are the most thorough method of determining which existing systems are failing.

Violation as an Encumbrance. In many states, the effect of a sanitary code violation on the title to the property is unclear. In an effort to give notice to potential buyers of land containing sanitary violations, especially existing failing systems, states and localities are urged to pass legislation which makes the violation an encumbrance on the title. Such an encumbrance will put buyers on notice of the violation and will probably lower the price of the property since the seller does not have a clear title.

Pre-Sale Inspection. An alternative to the encumbrance would be to require an inspection of the on-site system prior to the sale of the property. Legislation or ordinances could be worded to either require the correction of all violations before permitting a sale or to encumber the title.

Abatement Costs. Many regulatory authorities have the authority, under certain conditions, to enter onto private property and to abate or correct violations -- usually a failing on-site system. Those regulatory agencies which lack this authority should lobby to get this power. Further, however, it is necessary that the enabling legislation specifically provide that the cost of the work may be added as a tax on the lands upon which the violation occurred. Also, the agency should be given the authority to contract to have this work performed.

VI. Special Governmental Units

The use of special governmental units to install, operate, maintain and repair on-site systems is a suggested improvement which requires special consideration. These units might be a special purpose district such as a sanitary district, drainage district, etc. or it might be a special function of an existing governmental unit such as a town or preferably a county.

The use of special governmental units should improve the regulation of on-site systems at all three of the phases. Briefly, the advantages would be:

(1) Proper control over the siting and design of each on-site system;
(2) Strict supervision of the construction;
(3) Inspection and maintenance assured; and
(4) Replacement of failing systems probably paid for out of a replacement fund.

Basically these advantages should accrue regardless of the type or size of governmental unit. However, there might be economies of scale in larger jurisdiction units, thus units at say the county level might be preferable.

States which do not currently have legislation permitting such special purpose districts should consider enacting the necessary legislation. However, the National Demonstration Water Project currently has several affiliates which are using non-governmental units to regulate water supply and wastewater disposal systems. For example, both non-profit corporations and REA electric cooperatives are regulating such systems (Anon., n.d.).

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