SEPTIC TANKS AND THE THREAT TO OUR POTABLE WATER SUPPLY

ADWA

A Position Paper Prepared by the American Decentralized Wastewater Association

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I. FOREWORD

Fifty years ago, the National Academy of Sciences National Research Council issued Publication 586 to help Federal, state and local health officials evaluate home aerobic sewage treatment methods. The study was financed and conducted by the U.S. Public Health Service. Its core message was presented immediately in the foreword: "The development of the individual household aerobic sewage treatment systems represents a departure from conventional methods of sewage disposal for residences. Considerable interest, however, has been evidenced by health and other authorities at the Federal, state, and local levels in regard to the potential of these devices in providing trouble-free methods of sewage disposal." Here are their *General Conclusions Regarding the Utility of Aerobic Sewage Treatment Systems*: "That existing experimental and commercial household aerobic sewage treatment and disposal devices should be regarded as a significant development in sanitary engineering practice with present application under special environmental circumstances."

This message must have been clear to any health official who read Publication 586: in order to effectively protect America's potable water supply, the century-old septic tank must be replaced with modern aerobic treatment technology.

Back in 1957, almost one-third of American household waste was ineffectively treated in septic tanks. Almost 50 years later, when the suburban American population has more than doubled beyond sewer lines, one-third of households are still emptying their wastewater into Civil War era septic tanks, and the nation's potable water supply is even more obviously at risk. "Half of all Americans and 95 percent of rural Americans use ground water for drinking water," reports "A Home Buyer's Guide to Environmental Hazard," published by Alexander Hawes LLP. "The U.S. Centers for Disease Control reports an average of approximately 7,500 cases of illness linked to drinking water in the United States each year. This estimate generally is thought to be considerably lower than the actual figures because drinking water contaminants are not always considered in the diagnosis of illness."

In 1998, under the auspices of the Water Science and Technology Board (WSTB), the National Research Council (NRC) tried again to capture the attention of Federal, state and local health officials. This esteemed body of leading scientists from multiple disciplines chose a 15-member committee of experts to study and report upon the strategy to manage the Catskill/Delaware watershed, one of our nation's most important boundaries for surface water. This watershed supplies potable water to more than nine million people in New York State and City. The NRC selected the 15 committee members "for their special competences and with regard for appropriate balance."

Finally, in 2000, after two years of study, The National Academies, whose members are drawn from the National Academy of Sciences, the National Academy of Engineering, the Institute of Medicine and the National Research Council, published and distributed the committee's resulting report, a 528-page review of the New York City watershed management strategy entitled, "Watershed Management for Potable Water Supply." The paperback edition is available from The National Academies Press website located at:
http://books.nap.edu/openbook.php?record_id=9677&page=528.

If you turn to page 20 of the report's Executive Summary, you will find this conclusion:

"Current technologies being used for new and replacement OSTDS (On-Site Sewage Treatment and Disposal Systems) in the Catskill/Delaware watershed are not adequate: they do not represent best available control technologies. Implementation of aerobic treatment systems for OSTDS, including a significant enforcement effort, could substantially reduce effluent concentrations of *Giardia, Cryptosporidium*, fecal coliforms, and viruses in all Catskill/Delaware watersheds. Therefore, aerobic treatment units should be mandated for new or replacement OSTDS, and enforcement efforts should include annual inspections. This recommendation is especially important for the Kensico watershed, because of its critical location in the water supply and because OSTDS serves a large percentage of the population."

Later, on page 481, please read this NRC recommendation: "As previously mentioned, passive septic tank and drainfield combinations provide inferior treatment of residential wastewater compared to ATUs (Aerobic Treatment Units). Thus, the most rigorous standards for OSTDS treatment technology are not being applied . . . The BACT (best available control technology) strategy envisioned by the committee calls for the mandatory use of aerobic systems to maximize effluent quality entering the drainfield, combined with an annual operating permit and other regulatory methods to limit failures and minimize repair time. This strategy was the basis for reducing estimated annual failure rates of OSTDS from five percent to zero percent."

That message is a repeat of the advice proffered 50 years earlier in Publication 586. Today, even after industry has engineered so many remarkable advancements in residential aerobic technology, the preferred method of regulation remains the same — 100 year old anaerobic septic tanks. They continue to send pollutants into our oceans, lakes, rivers, streams and watersheds.

II. HOW SEPTIC TANKS IMPERIL OUR POTABLE WATER SUPPLY

Even without reading the warnings from America's scientific community leaders, other dire news has been appearing for years about septic tanks and the risk they present to our potable water supply. Here are just three examples.

- "The failure to provide safe drinking water and adequate sanitation services to all people is perhaps the greatest development failure of the 20th century . . . If no action is taken to address unmet basic human needs for water, as many as 135 million people will die from these (preventable water-related) diseases by 2020 . . . This problem is one of the most serious public health crises facing us, and deserves far more attention and resources than it has received so far." – Peter H. Gleick, Pacific Institute Research Report, "Dirty Water: Estimated Deaths for Water-Related Diseases 2000 – 2020."

- "Of all ground water pollution sources, septic tank systems and cesspools rank highest in total volume of wastewater discharged directly to soils overlying ground water, and they are the most frequent sources of contamination." — United States Environmental Protection Agency.

- "It is estimated that only 40% of existing septic tanks operate in an efficient manner . . . The design life of many septic tank systems is in the order of 10 to 15 years." — Larry W. Canter and Robert C. Knox, "Septic Tank System Effects on the Quality of Ground Water", Lewis Publishers, Inc.

Despite decades of work to reduce pollution from industries, sewage plants and runoff, the nation's potable water supply remains in jeopardy. The biggest problems still occur whenever it rains as untreated sewage runs into our drinking water supplies from cesspools and deteriorating septic systems.

According to the U.S. Geological Survey, the earth's surface is 71% water, but only 2.5% of that volume is potable. Of that potable water supply, nearly 70% is ice and almost 30% is subsurface, held both as soil moisture and within underground aquifers. That leaves .007-.009% usable potable water for people. The pressure on this small supply increases as the population grows, agricultural needs expand and business needs increase.

Even treated waste can carry bacteria, nitrogen and phosphorus that can contaminate drinking water and serve as fertilizer in streams, rivers, lakes and bays. The nutrients contribute to blooms of algae and microbes that deplete oxygen levels, choking fish and other aquatic life. Concern is also mounting over caffeine, antibiotics, hormones and compounds that threaten potable water supplies and the wider environment. Throughout America, the levels of nitrogen from failing septic systems have increased in groundwater over the years since Publication 586, in some cases reaching levels that have been shown to jeopardize the health of pregnant women and infants.

In an article entitled, “Rivers of Doubt,” in its June 4, 2007 issue, Newsweek reported, “Minute quantities of everyday contaminants in our drinking supply could add up to big trouble. . . across the nation, something’s causing disturbing effects on aquatic wildlife. In a search for culprits, scientists are zeroing in on a group of compounds they call ‘emerging contaminants,’ including pharmaceuticals, cosmetics and antibacterial soaps.”

Johnston Smith Consulting Limited, a consulting engineering firm in the UK, reports,” The effluent from a septic tank still contains about 70% of the polluted matter in the sewage, and hence there is a need for further treatment of the liquid from the tank.”

Consider this definition of septic tanks in the “Sci-Tech Encyclopedia”, the McGraw-Hill Encyclopedia of Science and Technology*: “Septic tanks do not treat sewage; they merely remove some solids and condition the sanitary flow so that it can be safely disposed of to a subsurface facility such as a tile field, leaching pools, or buried sand filter.”

Also, please see the septic tank definition posted at Wikipedia, the free, user-edited online encyclopedia. Following a list of potential problems, under the subheading “Environmental Issues”, you will find this content:

“Some pollutants, especially sulfates, under the anaerobic conditions of septic tanks, are reduced to hydrogen sulfide, a pungent and toxic gas. Likewise, nitrates and organic nitrogen compounds are reduced to ammonia. Because of the anaerobic conditions, fermentation processes take place, which ultimately generate carbon dioxide and methane, both of which are known greenhouse gases.

“The fermentation processes cause the contents of a septic tank to be anoxic with a low redox potential, which keeps phosphate in a soluble and thus mobilized form. Because phosphate can be the limiting nutrient for plant growth in many eco-systems, the discharge from a septic tank into the environment can trigger prolific plant growth including algal blooms which can also include blooms of potentially toxic cynobacteria.

“Soil capacity to retain phosphorus is large compared with the load through a normal residential septic tank. An exception occurs when septic drain fields are located in sandy or coarser soils on property adjoining a water body. Because of limited particle surface area, these soils can become saturated with phosphate. Phosphate will progress beyond the treatment area, posing a threat of eutrophication to surface waters.

“In areas with high population density, groundwater pollution levels often exceed acceptable limits. Some small towns are facing the costs of building a very expensive centralized wastewater treatment system because of this problem, owing to the high cost of extended collection systems. Too often, the efficient and economical alternative of a properly designed de-centralized wastewater treatment plant is not considered.

“To slow pollution, building moratoriums and limits on the splitting of property are often imposed. Ensuring existing septic tanks are functioning properly is also helpful for a limited time, but it is not the solution. Once polluted, groundwater is very slow to clean – thus urgent action is appropriate.”

* *McGraw-Hill Encyclopedia of Science and Technology*, 5th edition, published by The McGraw-Hill Companies, Inc.

III. AEROBIC VERSUS ANAEROBIC TREATMENT METHODS

Comparing aerobic versus anaerobic methods of treatment, a paper entitled, “Biogas Processes for Sustainable Development”, published in 1992 by the Food and Agriculture Division of the United Nations and authored by Uri Marchaim, of the MIGAI Galilee Technological Centre Kiryat Shmona, Israel, concluded as follows:

“Aerobic microbial communities have several specific advantages. They have large free energy potentials, enabling a variety of often parallel biochemical mechanisms to be operated. These communities are therefore capable of coping with low substrate levels, variable environmental conditions and multitudes of different chemicals in the influent. They have some very useful capabilities such as nitrification, denitrification, phosphate accumulation, ligninase radical oxidation, etc. which make them indispensable in waste treatment.”

Biotank Ltd., a septic tank manufacturer in the U.K., even admits to problems with septic tanks. This statement was posted at the company’s website in 2002: “Anaerobic digestion has its drawbacks. The main one is that it requires more stringent process control and only reduces the organic pollution by 85 to 90%, which means a second step is usually needed to guarantee high effluent quality. This is usually an aerobic stage for polishing before discharge. As anaerobic biosolids production is rather slow, the nutrient removal (nitrogen and phosphorus) is equally low as well. This is one more reason for applying an aerobic second stage, which removes the residual nutrients which would otherwise cause eutrophication of the river in which the treated effluent is discharged.” *

In comparing the two treatment methods in a technical brief published on July 29, 1999, The WELL Resource Center for Water, Sanitation and Environmental Health — which is funded by the United Kingdom’s Department for International Development and managed by Loughborough University in Leicestershire, UK — came to this conclusion: “The main disadvantages of the anaerobic processes are that they are much slower than aerobic processes and are only good at removing the organic waste (the ‘simple’ waste, the sugary material) and not any other sort of pollution – such as nutrients or pathogens. Anaerobic processes generally like ‘steady’ effluents — they are not good with coping with variations in flow or composition.” **

For additional comparisons, you may want to refer to “ENVIRONMENTAL MANAGEMENT: WASTEWATER and GROUNDWATER TREATMENT”, one of 12 books published by Chemical Engineering Magazine in its Engineering Book Series (362 pages).

The environmental hazards presented by septic tanks are described by the Association of State and Territorial Solid Waste Management Officials: “There’s a potential for . . . pathogens to contaminate soil, water, air, vegetation, and animal life, and ultimately to be hazardous to humans . . . Toxic substances such as cadmium that accumulate in plant tissues can subsequently enter the food chain, reaching human beings directly by ingestion or indirectly through animals. If available nitrogen exceeds plant requirements, it can be expected to reach groundwater in the nitrate form. Toxic materials can contaminate groundwater supplies or can be transported by runoff or erosion to surface waters if improper loading occurs. Aerosols which contain pathogenic organisms may be present in the air over a land spreading site, especially where spray irrigation is the means of septage application. Other potential impacts include public acceptance and odor." (Fact Sheet 3, USEPA Handbook — Septage Treatment and Disposal, 625684009)

Besides threatening water supplies and local fisheries, hundreds of millions in tax dollars and billions in development opportunities are at risk. Some groups argue that water quality and the environment have taken a back seat to growth and cost-cutting measures that often benefit developers and county and local governments.

* 2002 copyright Biotank Ltd. Septic tanks
** Technical Brief, "Wastewater Treatment Options", Water and Environmental Health at London and Loughborough (WELL), July 29, 1999, Page 128.

IV. THE RISKS OF CONTINUING TO DO NOTHING

When we refer to clean, safe water, we do not mean "clean" in the chemical sense. We are alluding to a dynamic balance between the nonliving macro-nutrient-scarce matter and the living organisms in water. This balance in relationships of life forms to one another, perhaps developed over the course of a couple of billions of years, are always changing; but they are also persistently striving for equilibrium as they expand in healthy diversity. Today, most of the waters on Earth are dreadfully unhealthy. Scientific study sponsored by United Nations Food and Agriculture Organization and Consultative Group on International Agriculture Research warns that the amount of water needed will double over the next 50 years for the rapidly growing world population. The study suggests that this deepening water crisis could fuel violent conflicts, dry up rivers and increase groundwater pollution and force rural poor to clear more grasslands and forests to grow food.

According to a Newsweek article entitled "Troubled Waters" published in June 2007, "Daily life in the developed world has depended so much, for so long, on clean water that it is sometimes easy to forget how precious a commodity water is. The average American citizen doesn't have to work for his water; he has only to turn on the tap. But in much of the rest of the world, it isn't that simple. More than a billion people worldwide lack clean water, most of them in developing countries. The least fortunate may devote whole days to finding some. When they fail — and they fail more and more often now that rivers in Africa and Asia are slowly drying up after decades of mismanagement and climate change — they may turn to violence, fighting over the small amount that is left. Water has long been called the ultimate renewable resource. But as Fred Pearce writes in his book 'When the Rivers Run Dry,' if the world doesn't change, that saying may no longer apply."

What happened to make all this so? In brief, there was a sudden infusion (sudden compared to the slow pace of evolution) of nutrients into the Earth's waters — in the form of water-borne human excreta. What follows touches on how water came to be used to transport human excreta, how bodies of water came to be used as the recipient dumps for the water-borne excreta, and what environmental effects have been associated with the chain of behavioral and technological developments resulting from these practices.

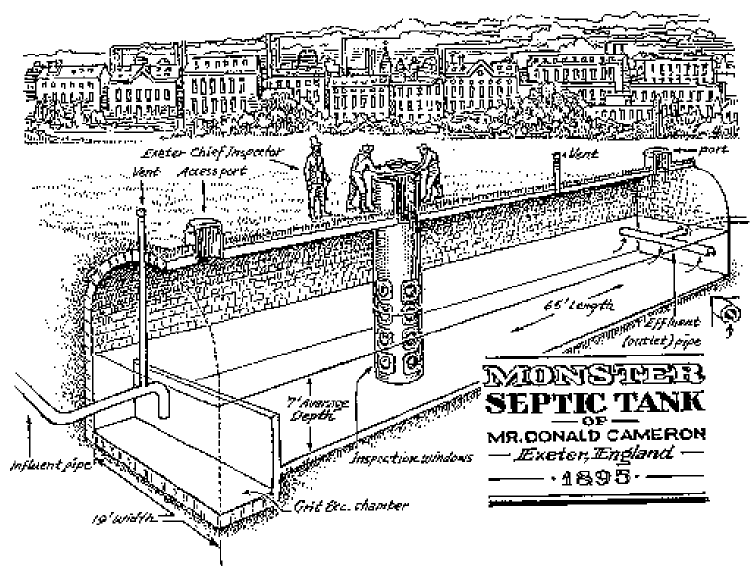
People have been settled — as opposed to living as nomads or hunter-gatherers — for a mere ten thousand years. Most Homo sapiens lived without the advantages or constraints of a settled residence for at least the first half of that ten thousand year period. As societies moved from nomadic cultures to more permanent civilizations, the concern over waste disposal became an important issue that has been dealt with in many different ways. Knowledge has been lost and regained. When groups were living as hunters and gatherers, refuse and human wastes decomposed naturally.

As cities developed, other mechanisms were necessary to address waste issues. First the Greeks and then the Romans focused domestic wastewater sanitation on minimizing health risks, primarily infectious diseases. They understood the relationship between water quality and general public health, and they engineered waste management systems. Like today's municipal sewers, however, they simply moved sludge from central urban centers back into water. When those civilizations crumbled, their sewage systems disappeared with them. In the West, failure of these urban societies led to the rural social order of the Middle Ages. This sanitation downfall brought back the outhouse, open trenches and the chamber pot, resulting in rampant disease and death. Only recently has the scope of wastewater management issues once again broadened to deal with chronic health risks.

Until the beginning of the 20th Century, the common method of sewage treatment was land spreading. In 1860, Louis Moureas invented the septic tank, although it would not be given this name until 1895. Septic tanks at this stage were used to treat sewage from communities. The main purpose of these large tanks was to remove large solids before discharge into the nearest stream or river; but the effluent was largely untreated sewage that polluted streams and rivers. The pollution of water was not solved by the septic tank.

Even with pre-treatment, the need for disposal technology was becoming evident. The demand to end disease led to plumbing and disposal development. The scourge of the 19th century was cholera. The urbanization of cities and the industrial revolution brought more people to cities and thus increased the amount of human waste accumulating in streets, rivers and streams. In the mid-19th century, a world-wide cholera epidemic occurred. The poor suffered the most, but even the wealthy were not immune. The relationship of cholera to water was discovered by the English physician John Snow. He traced the contamination to public wells that were being contaminated by privy vaults, which functioned much like early septic tanks, in the epidemic of 1854 in London. The sewer — which was last used by the Romans — came back into service for city populations, moving sludge into the Earth's oceans, rivers, streams and lakes.

Even in the 19th century, the septic tank was recognized as an ineffective way to deal with pollution, although the understanding of waste treatment was limited. The belief that running water purified effluents was widely held during the first half of that century, so the potential for water pollution did not raise the concern that the "nuisances" on land had. In the United States, with the exception of New York City, where sewer lines were installed, the septic tank continued to be the only waste handling method used. By the mid 1880s, two chamber, automatic siphoning septic tanks were being installed. The tank installed today is identical to the one used in the 19th century — it consists of two basic components: a septic tank and an underground disposal field. Wastewater flows from the house to the septic tank. Effluent, after the solids have settled out of the wastewater, flows from the tank to the drainage field. Most septic tanks operate by gravity, meaning that it's a passive system.



Smaller versions of this "Monster Septic Tank", circa 1895, are still in use in areas beyond municipal sewer lines and continue to release toxins into our environment.

According to a 1995 American housing survey conducted by the U.S. Census Bureau, approximately 25% of the housing units in the United States are served by septic tanks or cesspools (private, subsurface wastewater systems). In other words, there are currently more than 25 million septic tanks in use in the United States. About 400,000 new systems are installed each year. In some states, up to 50% of all households are served by septic tanks. In Canada, there are about 3 million active septic tanks and about 40,000 new ones installed each year.

In 1995 alone, according to an American Housing Survey (AHS) conducted that year, more than 2.5 million septic tanks were reported as malfunctioning or as totally broken down. Graham Knowles, of the National Small Flows Clearinghouse National Onsite Demonstration Project, authored a report titled, "Septic Stats, An Overview," based on this AHS data and on U.S. Department of Commerce Census Statistics. Mr. Knowles determined that, if current trends continue, as many as 4 million septic tanks will be malfunctioning by 2025.

About two-thirds of all the land area in the United States has been estimated to be unsuitable for the installation of septic tanks. Some homes don't have enough land area or appropriate soil conditions to accommodate the soil absorption drainfield that's required. In many communities, the water table is too high to even permit a drainfield. Homes are often located on wooded lots, or on lots too close to a body of water. Other potential septic tank problems: grease, cooking oil and fat can greatly reduce their efficiency; and household cleaners, paints and other toxic chemicals poison the bacteria that are meant to digest wastewater so the tank can operate properly.

The average American uses nearly 100 gallons of water daily (or about 75,400 gallons used annually by the average American family of three) for preparing food, bathing, washing clothes and dishes, flushing toilets and watering lawns and gardens, the National Wildlife Federation reported in the June/July 2004 issue of National Wildlife Magazine. According to The Environmental Protection Agency, “More than 4.8 billion gallons of water is flushed down toilets each day in the United States. The average American uses about 9,000 gallons of water to flush 230 gallons of waste down the toilet per year (Jensen, 1991).” USEPA statistics show that Americans use slightly less water than the 100 gallons per day reported by the National Wildlife Federation. According to the USEPA, the average American household of three people uses 225 gallons of water per day (which comes to 75 gallons per person per day). They say that about one-half is used indoors (see “Ground Water & Drinking Water” at the epa.gov website).

The principle contaminant in wastewater is microbiological, which refers to bacteria and viruses. Metals — lead, arsenic, iron, tin, zinc, copper and cadmium — pose interesting treatment problems, too. Untreated organic contaminants, such as solvents, cleaners, degreasers and pesticides, can move with wastewater through the soil and into groundwater. Everything that goes into the drain passes into the septic tank. This means that 200 to 400 gallons of water, including waste, goes into the average septic tank every day. If the tank cannot accommodate these flows, the sewage cannot be treated before it flows into the leach field.

Because a septic tank is out of sight, it is also often out of mind. What if the tank is not systematically maintained and drained? What if the leach field is in soil that cannot absorb the level of flow? What if the soil does not retain it long enough for additional decomposition to occur?

V. THERE IS MORE TO BLAME FOR THE POTABLE WATER SUPPLY PROBLEM THAN THE SEPTIC TANK. FAULT SPREADS TO MUNICIPAL SEWER SYSTEMS.

The environmental movement in the United States played a large part in creating the pressure that resulted in the Clean Water Act of 1977. Great sums of money were allocated exclusively for the laying of sewer pipes and the construction of treatment plants. The Clean Water Act funded virtually no on-site, site specific, decentralized systems — either for remediation or for new construction. Furthermore, the USEPA (U.S. Environmental Protection Agency) estimates that small under-served communities (those with 100,000 or fewer residents) still “need $13 billion to comply with the Clean Water Act.” (The USEPA is now focusing on these small communities because more than 1 million of their housing units still use outhouses or privies for sewage disposal and 19 million more still use septic tanks or cesspools as the primary source of treatment.)

A recent federal assessment by the U.S. Department of Agriculture found that 7 million U.S. residents face severe water quality or dependability problems, and another million lack basic indoor plumbing. Even communities with drinking water systems in place face increasing challenges as infrastructure ages and regulations increase. The USEPA estimates it will take more than $150 billion over the next 20 years to ensure the safety of our existing community water systems.

On February 20, 2004, the Environmental News Service reported, "The United States has a million mile network of sewage collection pipes designed to carry some 50 trillion gallons of raw sewage daily to some 20,000 treatment plants. But parts of this complex and aging infrastructure are crumbling, environmentalists warn, posing a health risk to communities across the nation . . . sewage pollution costs Americans billions of dollars every year in medical treatment, lost productivity and property damage."

"We have a looming public health crisis on our hands that will take billions of dollars to fix," Nancy Stoner, director of NRDC's (Natural Resources Defense Council) Clean Water Project, says. In fact, it may cost even more. A statement on the report ("Swimming in Sewage") by the Association of Metropolitan Sewage Agencies says the Congressional Budget Office, the Government Accounting Office and the USEPA all agree there is a national funding gap estimated to be as high as $1 trillion for water infrastructure.

The report includes seven case studies from around the country that illustrate how exposure to sewage pollution has killed or seriously injured people and harmed local economies. The case studies are from California, Florida, Indiana, Michigan, Ohio, Wisconsin and Washington, DC.

The account also cites figures from the U.S. Environmental Protection Agency (USEPA) that found in 2001 there were 40,000 sanitary sewer overflows and 400,000 backups of raw sewage into basements. The USEPA estimates that 1.8 million to 3.5 million individuals get sick each year from swimming in waters contaminated by sanitary sewage overflows.

Many older municipalities, especially in the Northeast and Great Lakes regions, have sewage collection systems designed to carry both sewage and storm water runoff, according to the USEPA, which estimates that some 1.3 trillion gallons of raw sewage are dumped each year by these combined sewer overflows. You can read the full report online at **www.nrdc.org**.

The Catskill/Delaware watershed that is covered in "Watershed Management for Potable Water Supply" is far from the only major potable water supply that is in crisis. In its January 23, 2007 issue, The Washington Post reported that the Anacostia's watershed, which supplies potable water to our nation's capital, the Chesapeake Bay area and 85 percent of Maryland, is in big trouble: "One revolting source of pollution is the District's sewer system, designed more than 100 years ago to dump raw sewage into the river during rainstorms. The D.C. Water and Sewer Authority has a plan to dig huge tunnels under the city to store this flow and then treat it to remove the sewage. But the agency's chief of staff, Johnnie Hemphill, told The Post that the project could take close to 20 years and $2 billion. This month, the U.S. Supreme Court let stand a lower court's ruling that set stricter caps on the amounts of pollutants dumped into the Anacostia. Jerry N. Johnson, the water and sewer authority's general manager, said the new rules may slow the project while officials figure out how to adapt. But the cleanup must go faster, not slower."

Just ask the 1,000 residents of Palouse, Washington about how expensive it can be to build a new municipal treatment system. A few years ago, they learned their 1950s-era treatment plant was not meeting state regulations. The cost to replace it was estimated at between $7 million and $8 million, or almost $8,000 per resident.*

This big money has attracted a powerful combination of seemingly disparate interests — regulatory, environmental and industrial, overwhelming any popular opposition to the tax burden required to fund this massive public project, which in cost is second only to that of the U.S. highway construction program. Town after town, each with typically 5 to10% of on-site wastewater systems (mostly old cesspools and “modern” septic tank/leach fields deemed to be failing) have moved to central collection and treatment of sewage; but it’s this centralized treatment of sewage that creates sludge. The more extensive the treatment, the greater the sludge problem has become. Disposing of it has become a major and growing problem for municipalities. In some places, sludge has been dumped into “sanitary” landfills, causing serious groundwater pollution. In other places, it has been incinerated, causing serious air pollution. Remarkable as it may seem given the stated objective of removing pollutants from the water, cities built on ocean shores have simply dumped the sludge into the ocean. In 1992, the ocean dumping ban went into effect, and sewage sludge was rechristened “beneficial biosolids” for agricultural use. The benefit of this content compared to the dangers of the toxic matter in it is a key point in the debate about land application of sludge.

As long as the warnings and advice of the experts of NAS/NRC go ignored, damage will continue to be done to our water, soil, and human health — whether by the pit latrine, the flush toilet, the septic tank/leach field, or by the central sewage collection and treatment plant, which creates an unpredictably toxic, and therefore un-recyclable, sludge. The only principle by which we can simultaneously protect the soil, the water, and human health is through technologies and management systems that systematically segregate human wastes and recycle them to agriculture, from which for the past 10,000 years they have come. It’s all been clearly spelled out by the National Academy of Sciences, the National Academy of Engineering, the Institute of Medicine and the National Research Council.

While it presents concerns for everyone, water and wastewater professionals need to be especially aware of the environmental impact of global warming. If the threat to our nation’s water supply increases or the supply of potable water is reduced in volume, the quality of any recharge to the water supply becomes critical. Onsite wastewater treatment systems will have an increasing impact in maintaining water quality, primarily by preventing pollution of aquifers that may be reduced in size. Even without the future impact of global warming, much of the potable water supply of the country is currently dependent upon management of onsite sewage treatment and disposal systems.

Here’s the established, scientifically proven fact: Replacement of anaerobic septic tanks with aerobic treatment systems will allow us to reduce sludge, recover our failed leach fields and restore our potable water supplies. It is not too late. Now, if only there was an agency with the knowledge, power and authority to require and enforce that replacement.

* West Virginia Alumni Magazine, Fall Issue, 2

VI. THE COSTS TO RESCUE OUR TROUBLED WATERS MUST BE SHARED BY ALL

All sewage treatment systems require some degree of management and maintenance. Yet, septic tanks — the most basic treatment method in existence — are generally inspected only after they fail.

Yes, there is a cost to replace septic tanks in order to rescue our potable water supply. Every owner of a new residential aerobic treatment system must pay for the system's purchase and installation. Electricity is required to run the aerator that injects fresh oxygen into the wastewater being separated and treated inside the system. Also, the local distributor is responsible for providing service the first two years for any systems they install. After those two years, each system must be inspected and maintained according to local health and environmental department requirements, which may be as often as every six months. Local health officials are responsible for policing the required maintenance as well as overseeing the installation itself, when required.

Everyone involved in replacing septic tanks with aerobic treatment systems must make some sacrifice in order to benefit, and everyone wins in the end. To our associates who are charged with regulating the health and safety of our citizens and our national water supply at the federal, state and local levels, we formally request that you follow the 50-year-old advice of the NAS/NRC — begin to immediately require the replacement of anaerobic septic tanks with modern aerobic treatment technology. It's the right thing to do. It's the right time to do it.

The USEPA has reported that onsite systems can and should be permanent solutions to wastewater treatment. Perhaps the most prominent example of this is the USEPA Response To Congress On Use Of Decentralized Wastewater Treatment Systems published in 1997.

Highlights of the USEPA summary are as follows:

- *"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."*
- *An area of concern is "failing or obsolete wastewater systems in less densely populated areas."*
- *There are many benefits of decentralized systems, with cost-effectiveness being "a primary consideration."*
- *There are several current barriers to the expanded use of decentralized systems, these barriers include: **LACK OF KNOWLEDGE****, public misperception, legislative and **REGULATORY CONSTRAINTS***, financial barriers, lack of management programs, liability and engineering fees.*
- *The USEPA has ongoing and planned activities to devote funding, education, technology, demonstrations and program development efforts to help small communities meet their wastewater needs by implementing alternatives such as decentralized treatment systems.*

**emphasis added ADWA*

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Mortgage Insurance Companies of America
National Association of REALTORS[R]
National Council of Savings Institutions
Office of Thrift Supervision
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