

Comment and Controversies

**SEWERS, SEWAGE TREATMENT, SLUDGE:
DAMAGE WITHOUT END**

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ABSTRACT

It is in the nature of sewerage and sewage treatment to compound environmental problems in the process of moving sewage and in attempting to remove from sewage the pollutants it carries. Spreading sewage sludge on land is but the latest in the compounding of environmental damage from sewerage. This practice must be banned and there must be a federal reorientation of all technology dealing with human excreta and the waste materials from industry and society that now are carried away by sewers. The reorientation must center on biologically based on-site pollution prevention and resource recycling technologies mandated through a revised Clean Water Act.

The fall 2001 conference at the Boston University School of Public Health, "Sewage Sludge on Land: Public Health and Environmental Impacts," was called to discuss the danger to human health and the environment in the spreading of sludge on land. This article's argument is that sewage sludge should not be spread on land because its contents are at any moment so vastly various and so constantly changing as to be far beyond the analysis adequate to establish safety. Sludge is the residue created in the attempt to retrieve clean water from sewage. The water is to be made clean by extracting from it the vast array of pollutants which it is the very purpose of sewers, hence sewage, to receive. The more thoroughgoing the attempt to clean the sewage, the more thoroughly noxious the residue—the sludge—will be. It is the very purpose of sewage treatment to make it so. And in *this* purpose, sewage treatment succeeds: it creates a mix so dense with the noxious as to be a very hazardous material. Indeed, given the certain presence in sewage of toxic materials on a vast scale, sludge properly understood should be classified as a *hazardous waste*.

The policy decision by the Environmental Protection Agency (EPA) that led to the wholesale spreading of sewage sludge on land was instigated by a number of environmental organizations opposed—properly—to the longstanding but devastating practice of dumping sludge into the ocean. However, the deal struck in the early 1990s between EPA and those environmental organizations—to put sludge on the land instead—was at best ill conceived. Nevertheless, spreading it on the land seemed a boon to local, state, and federal bureaucracies faced with rising costs of landfilling and increasing quantities of sludge. It was also an economic boon to the waste hauling industry. And, because sewage sludge contains human excrement (an excellent soil nutrient, to be sure), sludge was presented as if *it* could be a boon to agriculture as well: as “compost,” as “fertilizer,” as a “soil amendment”—as “biosolids” (EPA’s public relations term for sludge). But while human excreta contribute to sewage an agricultural fertilizer of known value, sewage’s many thousands of industrial and domestic chemicals are making sludge a lethal menace instead.

That the EPA has not classified sludge as a hazardous waste is indicative of lack of ethical principle on the part of the Office of Water within EPA, which is responsible for the implementation of the policy of land “application” of sewage sludge. For disinterested reason could never have claimed that disposing of sewage sludge on the land would be less harmful than dumping it in the ocean. Because sludge is, by its nature, a hazardous waste, and it is at once *unmonitorable*, *unregulatable*, and *irremediable*.

1. Because of the overwhelming complexity and unpredictability of what enters the sewage stream, sludge is *unmonitorable*. Of the 80,000 known chemicals and the unknown number of biological organisms and agents that can go down the drain, what does enter the sewage stream is unpredictable from hour to hour, from day to day, from month to month. Today, the sludge may contain an unusually high dose of mercury or lead; tomorrow it may get a spike of dioxin as pentachlorophenol and other organic chemicals interact chemically when they happen to enter the wastewater stream at the same time; the day after tomorrow, because of heavy rains, it may be inundated with cadmium from non-point-source road run-off; and where the sewer receives hospital wastes, the sludge will contain virulent and resistant strains of disease organisms as well as synthetic pharmaceutical drugs of every kind. This is but a minute sample of what sludge can—and will—bring to the soil.

2. Because its contents are so hugely various and unpredictable, sludge is *unregulatable*. Treated as the hazardous material it in fact is, all sludge would be regulatable only in the way that nuclear waste is regulatable and with an equal level of precaution to prevent its escape into the environment. But the EPA has developed terms for categories of sludge that suggest—falsely—that the different levels of “treatment” justify different levels of regulation. Thus “Class A” has been composted, heated, or pelletized (turned into uniform, safe-looking little nuggets). “Class B” has been “lime stabilized” and therefore permitted for

“application” on agricultural and other land, but with a few conditions (records must be kept, there must be setbacks from water, and livestock may not graze for a number of days after spreading it). The reason for adding lime to this sludge is to bind certain heavy metals in the soil so that they will neither be taken up by plants nor travel downward to the ground water. But this works only as long as the lime remains in the sludged soil, which in some soils is not long. Moreover, liming *volatilizes* other dangerous chemicals, such as ammonia. “Class B” sludge has been responsible for most of the illnesses reported across the country where people have been exposed to it either when it is spread or when it is stockpiled. Pathogens such as *Staphylococcus aureus* are carried in the chemical aerosols that rise from the sludge and are blown by the wind. Highly antibiotic-resistant strains of *S. aureus* are known to be present in “Class B” sludge wherever hospitals contribute to the sewage stream. Three deaths have been attributed to diseases contracted by air or by direct contact with “Class B” sludge. “Class A” sludge (sludge that has been composted, heated, or pelletized) was dubbed by the EPA regulators “exceptional quality,” or “EQ,” and proclaimed so good that *no records are required to be kept on date or location of disposal*. But it is the case that neither composting, nor heating, nor pelletizing can do more than reduce pathogens: elimination of disease organisms in it is a practical and economic impossibility. Moreover, it is well known that pathogens regrow in “Class A” sludge.

But more terrible, even, for the future than these disease organisms is that none of the 80,000 chemicals and their new, unknown, negatively synergistic *combinations* created in the highly active environment of the sludge—none of these will be eliminated by either composting, heating, or pelletizing. And so, with no records necessary, they pass untraced and untraceable into the soil to do untellable damage to life: if not this year, then in five, or ten, or fifty.

3. Because it inevitably contains so vast a number of materials hazardous to life mixed together in a quintessentially high entropy (i.e., unavailable for use) mixture, sludge is *irremediable*. And the *better* the treatment the *worse* the sludge and the *more* of it there will be. It is the reality that as long as there are sewers and waterborne carriage of wastes, and as long as the disposers and the destination can be anonymous, “getting rid of” whatever can be put down toilets and drains *will* be gotten rid of in that way. And no regulations, no “treatment,” nor any technological fix can turn the noxious brew that is the product of such technology and such behavior into a “fertilizer” safe for “recycling” into life—through agriculture into bacteria, into plants, into invertebrates, into us.

SEWERS: THE ROOT OF THE PROBLEM

The disposal of sludge is the immediate problem with which we are faced. Sewers, and the treatment of sewage that must unceasingly produce sludge are the deep problem. Using water as a transportation medium for waste materials

is the fundamental mistake that gave rise to so destructive and unfixable a sequence of mistaken technologies: sewers leading to vast water pollution; vast water pollution leading to sewage treatment; sewage treatment leading to the production of an unusable mix of all the pollutants that treatment could remove—sludge, the climax inherent in sewers and the water carriage of wastes. The spending of resources—time, energy, materials, money—on upgrading the level of wastewater treatment, on the construction of sewerage, or on efforts to “clean up” sludge, can be no more than a waste of all those resources. The time and energy and money should be spent instead on developing systems that do not cause the problems caused by sewers.

WHAT TO DO NOW

What can and should be done immediately and where should we be heading?

To begin with, there should be a federal ban on the land spreading of sewage sludge. No exceptions. “Class A” sludge will do just as much harm to human health and to the whole environment as will “Class B”: it will just take longer for the toxins, endocrine disrupters, and carcinogens to have their effect. Sludge should be disposed of as the hazardous waste that it is. It should not be allowed to pollute the air by burning, the ocean by dumping, or the earth by land “application.” It should be stored in hazardous waste landfills. Ceasing to produce sludge must be the goal.

Second, to solve the problem of the plus or minus 5 percent of the septic systems that are failing in the thousands of communities across the country that rely on septic systems: *do not sewer*. Instead, install on-site remediation technologies. There are many already on the market. These include upgraded septic systems that are superior in their ability to prevent or abate pollution. The advantages of a *sewer-avoidance* program are great. Pollution problems can first be dealt with locally, at their source, where it is possible to focus on the worst polluters and actual failures. Real capital and maintenance costs are always much less for on-site systems than for central sewerage and treatment. And with on-site treatment, development of communities is not bound to the rigid grid of sewer lines. And most importantly, the problem of water pollution becomes *solvable* instead of merely *movable*.

Third, in those cities and towns already sewerage, implement a *back-off-the-sewer* program. That is, begin the process of intercepting—and recovering for recycling—the resources (the constituents of what we call “waste”) as close to the source as possible. We must begin by changing the Clean Water Act (CWA), which now funds sewers and treatment plants, so that federal funding is made available for research into technologies necessary for the separation, recovery, and recycling—at the source—of industrial wastes. This would signal a shift away from the current end-of-the-pipe mix-it-then-fix-it managerial orientation of the CWA toward a pollution prevention orientation. Certainly as long as

there are sewers, controlling industrial wastes will not by itself solve the sludge problem, but it will reduce the range and quantity of materials entering the sewage stream and thereby both decrease the burden on central treatment facilities and the volume and toxicity of sludge produced. The aim here, too, is to move away altogether from water carriage of wastes and the hopeless tasks it entails.

SOME ESSENTIALS OF A SEWER AVOIDANCE PLAN

1. Do not extend any sewer lines to presently unsewered dwellings, institutions, or commercial facilities. It is true that all septic systems will sooner or later pollute the ground water. But because they do not centrally collect all water-carried municipal wastes, they can never pollute as badly as do either untreated sewage or “treated” sludge. Local pollution of groundwater by septic systems is, though not acceptable, less environmentally destructive than are the massive amalgamation of pollutants, their relocation when partially treated sewage effluent is discharged into lakes, rivers, and oceans, or the dumping, burning, or land application of sewage sludge. We must remember that, when we agree to pay for sewerage and upgrading the level of central treatment, though we may have improved the quality of a *local body of water*, the environment *somewhere* will still pay the price—in direct proportion to the amount of pollution from which we have saved the water that we undertook to protect. We will have paid only to move, not to cure, the problem. All on-site systems, including even the septic system with all its known deficiencies, have the great advantage over central collection of allowing for genuine upgrading as life-compatible technologies are developed.

2. Implement a rigorous program of internal industrial point source separation. Collect data from discharges and mandate official access to industry to allow monitoring of industrial processes and to give teeth to enforcement of regulations. The problem is political: mustering the political will to oblige each industry to pay for internal processing systems for all the chemicals used or produced by each industry.

3. Ban the use in consumer goods of substances that are toxic to humans or to the environment. Ban the use of toxic materials in industrial processes unless that use is proved safe. Require maximum recycling of production materials.

4. Prohibit the use of garbage dispose-alls. Using water to transport food wastes is as irrational as using water to transport human excreta or industrial wastes. Water should be used only for drinking and for washing. Food wastes should be kept separate (as they used to be) and returned to agriculture.

5. Start the necessary organizational and legislative work to develop land-use planning policies that actually protect the environment. Both residential and commercial development raise very important and highly charged issues, among them the protection of bodies of water from aesthetic pollution as well as from

physical pollution. These issues need to be faced head on. That means putting an end to the regulation of septic systems—and the certain pollution they eventually cause—as the indirect means of controlling development in unsewered areas. And the politicking that now gives EPA and state and environmental agencies the right to mandate sewerage and central treatment because of a handful of backing up septic systems must also stop. We must keep in mind that the central collection and treatment of sewage creates the worst land-use problems of all.

6. Beginning at the periphery of sewerage communities whose central treatment facilities are already overloaded, install systems designed for *on-site conversion* of toilet “wastes” into humus. These can be aerobic composting systems or anaerobic digesters. They should be able to handle food residues as well. This alone would intercept the great bulk of putrescible organic “wastes” at their source, preventing their becoming the terrible pollutant of water they now are, and it will allow instead for their contained, safe conversion to humus. It is of the utmost importance that these on-site composting or digestion systems, unlike sewerage and central collection, do not mix together all the industrial, residential, commercial, hospital, and non point-source wastes from towns and cities. Unlike sewage sludge, the product of these on-site systems *is* monitorable and regulatable and, if an individual system is misused to the point of toxification of the product, the problem is isolated and therefore manageable.

CONCLUSION

Central collection and “treatment” of sewage can never solve the problem of water pollution. It will only create ever more complex pollution problems. Sludge, the product of the latest mistaken technology in a long sequence of mistaken technologies, will, if permitted to be passed off as a “fertilizer,” inevitably have disastrous effects both on the agricultural soils on which it is disposed and on the boundless ecosystems connected to those soils. Biologically based on-site pollution-prevention and recycling technologies are available now. Funds now allocated for the extension of sewer lines should instead be saved for implementation of systematic source reduction, source separation, and low-entropy resource recovery technologies. These should become a federally funded choice for the communities of this nation. To implement such a sewer avoidance program will require the addition of an amendment to the reauthorization bill of the Clean Water Act. We must end the land spreading of sewage sludge now and begin the work of turning the Clean Water Act into a pollution prevention act.

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