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#561 - New U.S. Waste Policy, Pt. 2: Sewage Sludge
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In the mid-1980s, a citizens' organization in New Jersey --Clean Ocean Action, led by Cindy Zipf --launched an aggressive campaign to protect the oceans from the dumping of toxic sewage sludge. They were up against extraordinary power: U.S. Environmental Protection Agency (EPA) opposed them; New York and New Jersey environmental officials opposed them; nearly every municipal government opposed them. But they persevered and won.

Thus in the early 1990s, municipalities had to find other places to dump their sewage sludge.

As we saw last week, sewage sludge is the mud-like material that remains after bacteria have digested the human wastes that flow from your toilet into your local sewage treatment plant. If human wastes were the only substances entering the sewage treatment plant, then sewage sludge would contain only nutrients and should be returned to the land.

Unfortunately, most sewage treatment plants receive industrial toxic wastes, which are then mixed with the human wastes, creating a poorly- understood mixture of nutrients and industrial poisons. Furthermore, many American cities have built sewage systems that mix storm water runoff with the regular sewage; every time a rain storm scours these cities' streets, additional toxins are added to the sewage sludge.

As a result, sewage sludge contains a strange brew of nutrients laced with low levels of PCBs [polychlorinated biphenyls]; dioxins and furans; chlorinated pesticides [such as DDT, DDD, DDE, dieldrin, aldrin, endrin, chlordane, heptachlor, lindane, mirex, kepone, 2,4,5-T, and 2,4-D]; carcinogenic polynuclear aromatic hydrocarbons [PAHs]; heavy metals [arsenic, mercury, lead, selenium, cadmium, etc.]; bacteria, viruses, parasitic worms, and fungi;[1] industrial solvents; asbestos; petroleum products, and on and on. American industry uses roughly 70,000 different chemicals and any of these can be found in sewage sludge --depending on who's pouring what down the drain at any given time and place. In addition to the original chemicals, unique metabolites and degradation products develop anew in sludge. To give but one example: trimethylamine can be converted to the powerful carcinogen, dimethylnitrosamine.[2]

The U.S. produces 5.3 million metric tonnes (11.6 billion pounds) of sewage sludge each year (that's dry weight, not including the weight of the water that carries it). Today about 16% of U.S. sewage sludge is incinerated and the ashes are buried in landfills; 38% of sludge is landfilled directly; 36% is spread onto farmland or forest land or otherwise mixed into soils; and 10% is handled in other ways (piled on the land and abandoned, for example).[3]

The sewage treatment industry --and the municipal governments that employ them --represent a powerful political force in the U.S. Together in the late 1980s they figured out that the cheapest thing to do with sewage sludge is to spread it onto or into the land, preferably as close to its point of origin as possible, to minimize transport costs.

However, there were obstacles to overcome. The public thinks of sewage sludge as dirty, smelly and dangerous. Few people thought sewage sludge sounded good as fertilizer for food. So the industry hired a public relations firm, Powell Tate, and renamed sewage sludge "biosolids." They convinced U.S. Environmental Protection Agency (EPA) to go along with this verbal detoxification. The Federation of Sewage Works Associations also renamed itself --they are now the Water Environment Federation (WEF).[4]

The scientific literature on sewage sludge is large, but much of it consists of articles intended to break down public resistance to the use of sewage sludge on farm land. It is "happy literature," not necessarily honest literature. Nevertheless, there is a core of serious research that has tried to discover what the consequences might be if farmers adopted sewage sludge as fertilizer. In recent months, we have examined this literature, and here is what we found:

** Sewage sludge is mutagenic (it causes inheritable genetic changes in organisms),[5,6] but no one seems sure what this means for human or animal health. In its regulations for sewage sludge, EPA has simply ignored this information.[7,8]

** Two-thirds of sewage sludge contains asbestos. Because sludge is often applied to the land dry, asbestos may be a real health danger to farmers, neighbors and their children.[9,10,11] In its sludge regulations, EPA does not mention asbestos.[7,8]

** EPA issued numeric standards for 10 metals (arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc).[8] However, the movement of metals from soils into groundwater, surface water, plants, and wildlife --and of the hundreds of other toxins in sludge, which EPA chose not to regulate --are poorly understood.[12] Their movement depends upon at least the following factors: plant species, soil type, soil moisture, soil acidity or alkalinity, sludge application rate, slope, drainage, and the specific chemistry of the toxins and of the sludge itself.[13,14]

** Soil acidity seems to be the key factor in promoting or retarding the movement of toxic metals into groundwater, wildlife, and crops.[15,16] In creating its regulations, EPA assumed that sludge-treated land would be under the perpetual care of a farmer who would lime the soil to keep it alkaline and prevent the metals from moving dangerously. For this reason, a buildup of toxic heavy metals in soils is often dismissed as irrelevant. But in the real world, farmers go out of business while acid precipitation keeps soaking soils with dilute acid year after year. A buildup of toxic heavy metals in soil today[17] seems to be a prescription for trouble 30 to 50 years down the road. [18]

The National Research Council (NRC) of the National Academy of Sciences gives sewage sludge treatment of soils a clean bill of health in the short term, "as long as... acidic soils are agronomically managed." However the NRC acknowledges that toxic heavy metals and persistent organic pollutants can build up in treated soils: "Potentially harmful trace elements and certain persistent organic chemicals in raw municipal wastewater become concentrated in the sludge during the treatment process, and, with repeated applications of sludge to the land, these chemicals may accumulate in the soil," says the NRC.[3] If such a buildup occurs and the soils are no longer "agronomically managed" but are left alone to be washed by acid rain in perpetuity, what will happen then?

** Research clearly shows that, under some conditions (which are not fully understood), toxic metals and organic industrial poisons can be transferred from sludge-treated soils into crops.[19] Lettuce, spinach, cabbage, Swiss chard, and carrots have all been shown to accumulate toxic metals and/or toxic chlorinated hydrocarbons when grown on soils treated with sewage sludge.[20,21,22,23,24]

** In some instances, toxic organics contaminate the leafy parts of plants by simply volatilizing out of the sludge.[2]

** There is good reason to believe that livestock grazing on plants treated with sewage sludge will ingest the pollutants --either through the grazed plants, or by eating sewage sludge along with the plants. Sheep eating cabbage grown on sludge developed lesions of the liver and thyroid gland. Pigs grown on corn treated with sludge had elevated levels of cadmium in their tissues.[25] Cows, goats, and sheep are also likely to eat sludge directly. In grazing, these animals may pull up plants by the roots and thus ingest substantial quantities of soil. A cow may ingest as much as 500 kg (1100 pounds) of soil each year.[26]

** Small mammals have been shown to accumulate heavy metals after sewage sludge was applied to forest lands. Shrews, shrew-moles, and deer mice absorbed metals from sludge.[27]

Insects in the soil absorb toxins, which then accumulate in birds.[28]

** It has been shown that sewage sludge applied to soils can increase the dioxin intake of humans eating beef (or cow's milk) produced from those soils.[29,30] Humans in the industrial world already carry unsafe burdens of dioxin in their bodies, according to EPA. (See REHW #390, #391, and #414.) From a public health perspective, any unnecessary addition of dioxin to human food chains is unthinkable and unacceptable.

** Sewage sludge is produced in the huge quantities day after day, year after year. Sludge never takes a holiday. Municipalities find themselves under relentless pressure to get rid of the stuff, day after day after day. It is exceedingly expensive to treat it to clean it up. Towns and cities have every inducement to cut corners, skimp on tests, fudge the numbers, claim that their sludge is cleaner than it really is. Farmers have no capacity to analyze sludge independently; they must rely on the word of the sludge supplier. Only an aggressive, independent oversight agency can protect public health. Where can such an agency be found? Who has confidence that their state government, or U.S. EPA, will play that role?

EPA has acknowledged that it hasn't adequate funding to oversee the nation's sewage sludge management program.[31,32] "At headquarters, staff has been cut dramatically over the last year, and we can only do so much," one EPA official told BIOCYCLE magazine.[31] And a Washington state official said, "...with EPA cutting back from financing the sludge program, the problem will be whether state or local officials have the resources to adequately oversee every [sludge] application site."[3]

Who, then, will protect public health from the purveyors of toxic sludge? Who will protect the nation's agricultural soils from contamination, providing food security for future generations?

And, finally, who will lead the transition to a truly sustainable way of managing human waste?[33]

--Peter Montague (National Writers Union, UAW Local 1981/AFL-CIO)

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[4] John Stauber and Sheldon Rampton, TOXIC SLUDGE IS GOOD FOR YOU (Monroe, Maine: Common Courage Press, 1995), pgs. 100-101.

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[33] Robert Goodland and Abby Rockefeller, "What is Environmental Sustainability in Sanitation?" IETC'S INSIGHT [newsletter of the United Nations Environment Programme, International Environmental Technology Centre] Summer, 1996), pgs. 5-8. The International Environmental Technology Centre can be reached at: UNEP-IETC, 2-1110 Ryokuchikoen, Tsurumi-ku, Osaka 538, Japan. Telephone: (81-6) 915-4580; fax: (81-6) 915-0304; E-mail: cstrohma@unep.or.jp; URL: http://www.unep.or.jp/.

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