

United Sludge Free Alliance

IS SEWAGE SLUDGE REALLY FREE FERTILIZER TO THE FARMER?

Sewage treatment plants were never designed to produce fertilizer: they were designed to treat and condense whatever goes down the drain from homes, businesses, industry, hospitals, laboratories, nursing homes and funeral homes. Sewage is treated at the waste water treatment plant in order to release the effluent water back into rivers or streams. The condensed remaining byproduct is called sludge or biosolids. Ocean dumping of sludge, banned in the 1980's because the toxic mix created dead zones, necessitated the US Environmental Protection Agency (EPA) and municipalities to find another way to dispose of the 7 million tons of sludge produced annually. Although untested for human safety, land application was promoted as the cheapest and easiest way to dispose of America's hazardous sewage waste. Approximately half of all of America's sludge is applied to farmlands, home landscaping and gardens, public parks and golf courses. What had been toxic waste that killed life in the oceans somehow morphed into a "beneficial use" program for farmers.

We are told that sewage sludge/biosolids are recycled organic human waste. The distribution of human waste was once acceptable, before the knowledge of the health and safety implications of modern chemicals, heavy metals and pharmaceuticals. While the human 'manure' is promoted, what is not discussed is the combining of thousands of chemicals from detergents, personal care products, industrial solvents and the bacterial, pharmaceutical and viral waste from medical and laboratory facilities. The filtered information the farmers and citizens receive from the sludge hauling industries helps make their big money, upwards of \$500 million annually. Pennsylvania is second in the nation in the number of waste water treatment plants and imports sludge from neighboring states including New Jersey and New York. Lancaster, Berks and York are the top counties in Pennsylvania for sewage sludge disposal.

For farmers, sludge is a less expensive alternative to synthetic fertilizer. Unfortunately, the use of sewage sludge as a fertilizer option for food production increases our health risk by directly introducing contamination into our food cycle and water supply. The waste water treatment process does not remove all the drugs, chemicals, pathogens or toxic levels of heavy metals and the EPA requires monitoring of only nine toxic metals. Hazardous compounds collect and increase as they are applied to the soil. Also, once toxic metals are applied, they remain in the soil unless they uptake into plants (especially green leafy vegetables or root crops), or migrate into ground water.

Treated sludge does not require testing or monitoring for bacteria, viruses and parasites and antibiotic resistant bacteria are now being discovered in both soil and ground water. Resistant bacteria can be transferred from sludge-contaminated soil and plants to grazing animals and humans, including 18 human-excreted viruses, 19 parasites and 31 bacteria. There are 5,000 annual deaths from food poisoning.

Farms throughout America, including Georgia, Vermont, Washington and Missouri, have been destroyed by the toxic pollutants in sludge. The farmers also often encounter financial ruin. In some cases, such as *United States vs. Cooper* the farmer was charged and imprisoned for improper disposal of Class B sludge. In other cases, such as Georgia farmer Andy McElmurray, the guaranteed safe sludge caused the death of his land and lifestyle. With the filtered information and constant reassurance of safety of the sludge, McElmurray had no idea that the sludge contained levels of arsenic, toxic heavy metals and PCB's two to 2,500 times federal health standards. His cows died a slow and painful death while he searched for an answer, finally finding the free and "safe" fertilizer was the cause of his problems. Even years after halting sludge application, his farm is still too toxic to support plants and livestock. In McElmurray's court case, *McElmurray v. USDA*, Judge Alaimo stated, "senior EPA officials took extraordinary steps to quash scientific dissent, and any questioning of EPA's biosolids program."

After accepting sludge as a fertilizer for cultivation and grazing, Georgia farmer Bill Boyce also lost his 50-year old family farm. Despite constant reassurance from sludge haulers and the city of Augusta, Boyce witnessed the steady decline of his prize-winning dairy herd. In 1999, Boyce had milk tested from his cows. Independent milk tests revealed high levels of thallium, molybdenum and cadmium. EPA lists thallium as a toxic heavy metal that can cause gastrointestinal irritation and nerve damage, but the agency has no standard on the metal's presence in milk. Although regarded by the US Agriculture Department as one of the most dangerous agents of potential bioterrorism against the nation's food supply, thallium is not tested in sludge. Boyce won his court case, *Boyceland Dairy v. City of Augusta*, but only after the death of his cows and the poisoning of his land. His dreams of passing the farm on to his children were shattered.

In 2002, the National Research Council (NRC) reviewed Part 503 of the US EPA standards of sewage sludge. NRC found the basis of the 1993 chemical standards for biosolids to be outdated and suggested that "additional scientific work is needed to reduce uncertainties about the potential for adverse human health effects from exposure to biosolids." Because different soils have different toxicity abilities, blanket standards for acceptable levels are irrelevant. Periodic reporting is required, but enforcement is largely "self-implementing" with the sludge producers and haulers often performing the monitoring and record keeping. No permits or record-keeping are maintained for applications of Class A sludge. Without permits or records, there is no way to track sludge products or assess cumulative loads of substances like heavy metals. Without oversight, even required practices, such as agronomic rates to meet crop nutrient plans and setback distances from waterways, cannot be enforced. For the farmer, there is no way to track what compounds are being applied to his land should he experience a drop in production of crops or health of livestock.

What Farmers Are Not Told About Sludge:

- 1) No two loads of sewage sludge have the same composition of chemicals or pathogens, so the farmer does not know what is actually applied on his land. Load testing is inconsistent and unmonitored.
- 2) Independent tests from Cornell University Waste Management Institute find that farms using sewage sludge as fertilizer may actually experience a reduction of crop production after several years.

- 3) Farmers put themselves at financial risk and liability for any nuisance litigation from nearby neighbors exposed to sewage sludge causing property damage, well-water pollution, personal injury, illnesses or death.
- 4) There is no financial liability to the sludge hauler or municipality after they discontinue dumping sludge on a property. In fact, the farmer can be held accountable to clean his own property if soil tests show high levels of heavy metals and toxins.
- 5) In PA, a sludged property must make this fact known as a “Hazardous Use” on a “Seller’s Disclosure Sheet” at the time of property sale. Neighboring property to a sludged farm must also state this fact at the time of a sale and the farmer may be held accountable for reduction of property value.
- 6) Under the Clean Water Act, sludge is declared a pollutant and must be disposed of properly, an issue that is downplayed by companies spreading sludge on farmland because the farmer will be the one charged with breaking the law.
- 7) The stunning lack of research on the impact of dioxin in sludge applied to pastures is unsettling. Dioxin gathers in meat, fats and milk and is known to cause birth defects and as a carcinogen.
- 8) EPA has admitted there have never been cancer risk assessments for the pollutants in sludge yet there are known cancer causing agents in sludge, some of which have been found to cause cancer just from inhaling dust. Of course, cancer and other major illness often do not present symptoms for years

By accepting sewage sludge as a fertilizer option, regardless of approval by a regulatory bureaucracy or marketing by businesses, the farmer is unknowingly participating in damaging his own land, crops, livestock, family and future. Legal and insurance concern may argue that the farmer accepted known toxic material, therefore nullifying any obligation of protection. Can legal argument be made that a farmer who accepts sludge accepts the responsibility for transferring hazardous waste his own property? Large, independent bodies of scientific work point to the dangers of the “free” fertilizer and how sludge will impart our food and farm future.

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PART TWO

IS SEWAGE SLUDGE REALLY FREE FERTILIZER?

Human and animal foods are allowed to be grown on sludge-applied land and cattle are set to graze on pastures with sludge top dressing. There are waiting periods from the time the sludge is applied before human food crops, tobacco and forage can be harvested but there are no tests required to confirm hazardous levels of chemicals, heavy metals and pathogens in the plant or animal product. Cattle are to be kept from grazing for 30 days after application of sewage sludge on land yet no tests are required on the animal's physical intake. Unfortunately, no two loads of sewage sludge have the same composition of chemicals or pathogens, so the farmer does not know what is actually applied on his/her land even if the sewage treatment plant followed the EPA rules. Depending on the size of the waste water treatment plant (WWTP), testing of sludge is required once a month to once a year. Farm soil is tested annually for toxic metals, Nitrogen and Phosphorous.

Food crops grown on sludge-applied lands can absorb heavy metals present in the sludge treated soil. The heavy metals build over time and persist in soils. Plants continue uptake of heavy metals for decades after sludge is applied and even after sludge application is discontinued. Cumulative levels are also dependant on the uptake of various crops. For example, root crops are affected by toxicity before they may show trouble. Cadmium and lead, heavy metals linked to intestinal and kidney damage, have been found to be easily taken up in food products like carrots, potatoes, lettuce, spinach and grains. Various food crops can absorb various chemicals, yet these foods remain untested. The level of contamination is dependant on the varying compounds found in the sludge, most of which are untested. Sensitivity levels to heavy metals vary depending on the plant. No labels are required for food grown on sewage sludge and there are 5,000 annual deaths from food poisoning.

Some examples of heavy metal sensitivity variables include:

VERY SENSITIVE:

Chard, lettuce, beets, carrots, turnip, peanut, clovers,
crown vetch, alfalfa, sunflower

SENSITIVE:

Mustard, kale, spinach, broccoli, radish, tomato, birds foot
trefoil, soybean, snap bean, timothy, bent grass, ryegrass

TOLERANT:

Cauliflower, cucumber, zucchini squash, oat, orchard grass,
switch grass, Kentucky bluegrass, fescues

VERY TOLERANT:

Corn, Sudan grass, smooth brome grass

In some parts of the US, recycled water from WWTP is used to irrigate crops, including strawberries and broccoli. Multi drug-resistant bacteria are found to survive the treatment process and be present in the finished water product. In Santa Barbara, California, the effluent finished product of recycled water contained bacteria resistant to 11 of 12 antibiotics and were also chlorine-resistant. This water is also used to irrigate school, playgrounds and parks. In the Salinas Valley of CA, about 12,000 acres of leafy green and other consumed raw crops are grown. This area has recently experienced numerous problems with pathogen-contaminated foods. The push on CA farmlands and vineyards to use recycled water is the result of disposal challenges of sewage waste water effluent that does not and cannot meet water quality standard for being released into rivers and streams. Water effluent is now recognized to carry the remains of many of our chemical and pharmaceutical byproducts. For instance, recent studies have found that 75% of the key ingredient used in antibacterial hand soap, triclocarban, remains in sewage sludge even after it has been biologically treated for up to three weeks.

Excessive accumulations of certain metals, such as copper, zinc and nickel reduce crop yields. Yield reductions considered acceptable by EPA standards can be up to 50% regardless of the farmers crop needs. A long-term risks assessment of yield reduction as contaminants build over time has yet to be completed in the USA. Studies of long-term, sludge-treated fields in the UK, Germany and Sweden show that soils can be affected by metal concentrations that are not necessarily toxic to crops. Microorganisms in soils are instrumental in the health of plant and food growth, but the risk assessment of Part 503 of EPA standard does not set limits based on soil microorganisms. The cumulative limits of copper, nickel and zinc in Part 503 regulations are 10 times higher then those recommended by northern soil scientists especially in the northeast part of the US, where soils are acid.

Many of the metals allowed and accepted to US farmland application are over 100 times what other industrialized nations allow in sewage sludge application for farmlands. The following Cumulative Pollutant Loading Rate for toxic metals applied to farmlands are from PA Code Dec. 13, 2008.

Arsenic:	36 lbs. per acre
Cadmium:	34lbs. per acre
Copper:	1,320 lbs. per acre
Lead:	264 lbs. per acre
Mercury:	15 lbs. per acre
Molybdenum:	No limit
Nickel:	370 lbs.per acre
Selenium:	88 lbs. per acre
Zinc:	2,464 lbs. per acre

There has been no risk assessment completed on the practice of sludge applied to pastures and not tilled into the soil. Risk assessment on grazing land after sludging has been discontinued assumes there is no residue, such as dioxin, in the pastures. The lack of research on the impact of dioxin in

sludge applied to pastures is unsettling. Dioxin gathers in meat, fat and milk. Many chemical contaminants and heavy metals found in sludge - including dioxin, PCB's, pesticides, some flame retardants and cadmium - tend to bio-accumulate in fat tissue and milk. Testing of the breast milk that a nursing mother provides and the effect on their babies, has not been compiled. Studies show that PCB's, dioxin and furans all concentrate in breast milk and are extremely accessible to the nursing baby. Milk in general collects and accumulates dioxin. This should be a major concern as milk is a such an important food source for infants and children.

Assumptions on the amount of soil that grazing and foraging animals consume vary depending on the animals, location, vegetation and soil exposure. Sludge applied to pasture and field crops where animals not only consume soils as part of their regular grazing process but also ingest sludge that is still on the plants, directly introduces the untested pathogens and poisons into the animal. Lack of data on the ingestion of sludge vegetation adds to scientific "guesstimating". Yet poultry is known to consume soil in their general foraging diet in varying amounts; geese will consume as much as 8% of their diet as soil, wild turkeys will consume up to 9% and chickens and other poultry have been found to accumulate dioxins in their bodies. For some animals, like sheep, up to 30% of their diet is soil from grazing. Wild animals also ingest foliage and soil in varying amounts and remain untested for health contamination. In communities where hunting is prevalent and game meat is part of the diet, sludge contamination must be considered.

Grazing animals ingest soil as part of their food source. The US EPA risk assessment assumes a mere 1.5% of animal's diet as soil intake. US EPA regulations do not restrict grazing on lands to which class A sludge has been applied and allow grazing 30 days after application of Class B sludge. Pathogen transmission can survive a one-month period. Denmark and Sweden do not allow sludge application of any kind on grazing land. Both Molybdenum (Mo) and Selenium (Se) can be readily taken up by plants and concentrated levels become toxic to foraging animals. Studies showing uptake of molybdenum into red clover and forage grass are examples of toxicity in forage materials. Molybdenum toxicity, unlike the slow and building toxicity of other heavy metals, is a short-term impact. The Part 503 rules used very few studies of Molybdenum uptake. Uptake of Molybdenum into legumes, including foraging alfalfa, is relatively high. Both Molybdenum and Selenium are highly soluble in both water and plants.

When sludge is considered a fertilizer, higher levels of toxic chemicals can be dumped on farmland using the Part 503 policy as a guideline based on the commercial fertilizer exclusion in the Superfund Act. In 1981, EPA published a document describing various persuasion techniques that could be used to induce public acceptance of sludge with suggestions of targeting low-income neighborhoods and cash strapped farmers. By January 1993, Part 503 was put into place nationwide to create a legal, though untested, loophole for sludge disposal. Since that time, the EPA has admitted there have never been cancer risk assessment for the pollutants in sludge, Yet, there are known cancer causing agents in sludge, some of which have been found to cause cancer just from inhaling dust. Of course, cancer and other major illness often do not present symptoms for years. In March 2002, the EPA Inspector General's report released by the Congressional Committee on Science casually stated that people were expected to die from sludge. The EPA and the sludge hauling industry have invested in promotion to develop the "good beneficial sell" to farm communities.

According to soil scientists at Cornell University Waste Management Institute, farmers using sewage sludge as fertilizer may experience reduction of crop production. In some cases, crop and livestock loss can take upwards of ten years to present as a noticeable problem. Cornell further warns farmers that they have assumed a big liability and risk if the sewage sludge contains chemical combinations that are toxic to animals, plants or humans. The farmer is also liable for any nuisance litigation from nearby neighbors finding the land application offensive or charges that exposure to the sewage sludge caused illnesses or death. In PA, a farmer who applies sludge to their property must make this fact known as a “Hazardous Use” on a “Seller’s Disclosure Sheet” at the time of property sale. Property neighboring a farm where sludge has been applied must also state this fact at the time of a sale and the farmer may be held accountable for reduction of value. Farmers using sludge should also seek indemnity insurance coverage by the sludge applier or sludge generator but this only applies while the property is accepting sludge. After the sludge company discontinues sludge distribution, a farmer will need his own liability and indemnity insurance. Also, under the Clean Water Act, sludge is declared a pollutant and must be disposed of properly. This issue that is downplayed by companies spreading sludge on farmland because the farmer will be the one charged with breaking the law should the soil become too toxic.

Land applications of unknown mixtures of chemicals, metals, and pathogens require careful thought and caution. In European countries, where land application of sewage sludge is successfully applied without danger to communities and food supply, household waste is separated from business and industrial waste at the source location and not combined at the WWTP. The mounting evidence from independent scientific studies not paid for by the sludge industry warns of short-term and long-term dangers to the health and safety of America’s water and food supply and the future of the farmlands that we rely on to sustain us.

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