

EPA Response to Inquiry from a Concerned Virginia Citizen
Rick Stevens – USEPA Office of Science and Technology
Biosolids Coordinator
January 18, 2008

The proper treatment, use, and disposal of biosolids represent an important part of the effort to improve water quality across the US. The U.S. population reached 303,336,863 in January 2008 and currently 16,455 POTWs treat 60 billion gallons of wastewater daily. Up to 55% of the 7.2 million metric tons of biosolids generated by wastewater treatment facilities in this country are managed through application to land (e.g., forests, reclamation sites, parks, golf courses, lawns and gardens, and agricultural land). Biosolids are applied to <1% of available agricultural land in the US annually, which leads to an opportunity for growth.

The US population is forecasted to double in the next 72 years and population growth results in increased human waste; biosolids production amounts will increase in tandem with population growth. Can you imagine >600 million people in the US!? Can you imagine more than 14 million metric tons of biosolids!? Actually, I can...not the people, but the biosolids. As population grows, municipalities are forced to find solutions for treating increased volumes of water. Additionally, as more wastewater is treated, the wastewater solids separated during the treatment process create a new challenge, what to do with the increased volume of residuals?

Options currently available to facilities for dealing with biosolids residuals include incineration, surface disposal, and land application. Land application and recycling of biosolids is the best available option and I will attempt to explain why. Sustainable management of residual material is in the public interest. Humans require enough calories per day to meet their energy needs. Where do we obtain our calories? Our calories are obtained from agriculture – farming and livestock production. Agriculture (land cultivation) accounts for over 98% of our food in the US. Aquatic systems contribute less than 2 % of this food.

The US is essentially self-supporting in matters of food production, but there are indications of potential concern. There are nearly 470 million acres of land currently in cultivation. About 1 million acres of arable land are lost each year due to industrial expansion, urbanization, and construction of transportation networks. Twice as much prime cropland is lost each year because of erosion and water infiltration. Poor agricultural practices (e.g., over-farming) can deplete nutrients, further decreasing amounts of arable land. There are currently 1.5 acres

of arable land per capita in the US. Each individual needs 1.2 acres to provide a diverse diet, suggesting that the land is reaching its food-production capacity.

Another way to look at land use is to examine the carrying capacity, or the average Americans “ecological footprint”. Each person's demands for residential space, water, food production, fiber, waste assimilation, and disposal covers 12 acres (not including recreation). Population growth leads to losses of one acre of farm land or wild land for each person added; this acre is converted to developed space or transportation corridors; arable land, rather than wild land, will probably bear the brunt of development due to the ease of construction. If current growth trends continue, land degradation and (sub)urbanization will consume approximately 120 million of the existing 470 million acres of arable land by 2050.

Why do I raise these statistics? These statistics demonstrate the importance of biosolids recycling. Biosolids are currently applied to less than 1% of arable land in this country. Thus, there is a huge opportunity for growth and expansion for the recycling of biosolids to farmland to assist in improving the food-production capacity per acre so that we can continue to receive needed calories and balanced nutrition.

In fact, land application of biosolids in compliance with federal and state laws is an environmentally sound and cost-effective option for communities to consider. Nutrients in biosolids provide savings in fertilizer costs. Commercial inorganic fertilizer (not from biosolids) production requires large amounts of energy and the use of fossil fuels; do you like being dependant on foreign oil?

Biosolids also add organic material to soils that help to improve soil structure and moisture retention. Biosolids may also add beneficial physical properties by buffering soil pH to a desirable range of 6.0 to 6.8 and by improving soil. As a side note, soil is produced naturally by erosion of rock, deposition of natural organic matter (dead plants and fungi, plus animal remains), and weathering. It takes 500 years to deposit one inch (25 millimeters) of topsoil. Meanwhile, the US is losing about 25 billion tons (equivalent to 23 trillion kg) of topsoil per year. Biosolids could perhaps be considered not only as a soil amendment but as a soil substitute.

Surface disposal of biosolids in monofills, as you suggest is merely long-term storage until population pressures demand alternative use of the monofill site. Monofilling also has hidden expenses. Immediate expenses include those for packaging the biosolids, carrying them to the disposal site (ideally via secure routes), and actual burial. Long-term costs surround

the possibility of monofill failure, sorption of sludge components to soil at unlined sites, and/or dissolution of leachate into groundwater supplies. Decisions may be needed concerning future excavation and/or restoration. There is no way to predict future costs, nor to ensure that the monofills are properly constructed (correct liner installation, using appropriate materials) in the first space. There will be an ongoing need for monitoring and surveillance, leading perhaps to establishment of new stewardship programs.

There is no universal solution to the issue of sewage sludge management. The solution must be appropriate to the local conditions. Agricultural use is a cost-effective solution, which is beneficial to soil provided that the levels of contaminants in biosolids will continue to decrease. For larger cities where available land is limited and the quality of biosolids is questionable, energy recovery may be a better alternative. Methods to recover other resources such as phosphorus in wastewater are promising but can be further improved and become more efficient in order to achieve future sustainable biosolids management.

The bottom line is that land application of biosolids in compliance with federal and state laws is an environmentally sound option for communities to consider. We must accept that biosolids are a by-product of human activity, and that biosolids production amounts will increase in tandem with population growth. The quality of land used for farming must be maintained and, ideally, improved to satisfy a key national need – fresh, high-quality food at reasonable prices. Biosolids should be considered less a nuisance and more a resource. Biosolids that are reused for landscaping and architectural purposes and thus recycling for agricultural purposes may eventually seem practical.

Rick Stevens
202-566-1135
202-566-1139 fax
stevens.rick@epa.gov

[humhaven18@aol.c](mailto:humhaven18@aol.com)
om

To
01/09/2008 01:40 PM Rick Stevens/DC/USEPA/US@EPA
cc

Subject
Mary C from Virginia

Hi Rick, I felt it necessary to email you to let you know that I do not blame you for the state of affairs in our rural communities in dealing with sludge applications. You personally do not have control over the companies that haul it and spread it. After saying all that I must tell you that with the amount of violations done to the citizens on this issue we no longer look to government agencies for relief. It seems that at this point they have turned a deaf ear to our problems, therefore we have turned to our legislators for support in getting much needed help.

Hopefully the future will bring about the change needed to aid Virginia's citizens. Thank you in advance for looking into the Monofills as an alternative to land applications of sewage sludge. This seems a common sense option. Any information you are able to produce will be greatly appreciated.

Sincerely,

Mary Carwile, Chair
Commonwealth Coalition (CRAS)
1010 Rosser Mill Road
Pamplin, VA 23958

email-humhaven18@aol.com