pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMON QUESTIONS ABOUT BIOSOLIDS

What are biosolids?

Biosolids are nutrient-rich organic materials derived from wastewater solids (sewage sludge and residential septage) that have been stabilized, meet specific processing and quality criteria and are suitable for land application. The term, biosolids, comes from the most common method of its production: the *bio*logical processing of wastewater *solids*.

Some biosolids are land-applied as a liquid while others are dewatered and have the consistency of wet soil. Other biosolids products include compost material and pellets. Pennsylvanians produce an estimated 2.2 million tons of wastewater solids each year, nearly a quarter of a ton per household.

How are biosolids made?

Biosolids are produced primarily from the treatment of wastewater at municipal treatment plants and from individual home septic tanks. Wastewater consists of wastes from household activities -- from the kitchen, dishwasher, laundry and bath. Industrial discharges also may be a part of wastewater treated at a municipal facility; however, regulations severely restrict the amount of industrial pollutants discharged to a municipal plant by requiring industries to pretreat their wastewater before discharge.

Only those biosolids that meet strict quality standards for pollutants, pathogens and vector attraction may be land-applied for beneficial purposes. All other biosolids must be disposed in a landfill or incinerated.

Why put biosolids on the land?

Biosolids contain organic matter and nutrients which can improve crop growth and the quality and structure of soil. Biosolids are an excellent resource to be used as an organic supplemental fertilizer, allowing farmers to save money by reducing the need for expensive commercial fertilizers. The land application of biosolids also aids reclamation at mining sites and silviculture. Recycling biosolids as a resource instead of disposing of them saves valuable landfill space, and can provide cost savings to taxpayers and municipalities while promoting reuse.

Do biosolids have an odor?

Biosolids may have a musty or ammonia odor. Sulfur and ammonia compounds in the biosolids normally are the cause of any odor. Both are plant nutrients. If biosolids are properly managed, odor should be minimized.

Do biosolids contain toxics or heavy metals?

Biosolids produced from wastewater treatment facilities in Pennsylvania typically contain low concentrations of metals. During the last 20 years, metal concentrations in biosolids have decreased dramatically through the aggressive application of industrial pretreatment programs by municipal treatment plants.

When sensitive analytical methods are used, metals in biosolids are usually measurable, although normally at concentrations well below federal and state safety limits. Many of the trace metals in biosolids (nickel, copper, iron, molybdenum, selenium and zinc) are micronutrients that are essential for healthy plants and animals. Other metals like cadmium, mercury and lead, which have little or no value to plants and animals, are also commonly found in small quantities. Extensive laboratory testing shows that organic compounds from pesticides or from polychlorinated biphenyl (PCBs) are either not detectable or present in very low concentrations. Only those wastewater solids that meet standards for pollutants, pathogens and vector attraction may be applied to the land.

It is important to point out that many trace elements of concern in biosolids are also present in conventional fertilizers and manure. There, too, those substances are nontoxic at the small concentrations and low rates at which they are applied.

Will land application of biosolids pollute groundwater?

When applied according to the Department of Environmental Protection (DEP) regulations and good farming practices, biosolids pose little or no potential risk to groundwater quality. As with any fertilizer product, however, the user must be careful not to over apply. Like other types of fertilizer, the greatest concern for groundwater from over-application is nitrate contamination. Regulations strictly limit the amount of nitrogen applied through biosolids application.

Unlike commercial fertilizers, about 95 percent of the nitrogen in biosolids is present in the slow-release organic form, making biosolids less likely to cause groundwater pollution from nitrogen. Federal and state regulations limit the application of biosolids on agricultural land to agronomic loading rates. This means the amount of nitrogen applied is limited to that needed by the particular crop to be grown, thus minimizing the amount that passes beyond the root zone.

In addition to nitrogen being managed through proper site restrictions and process, when biosolids are applied to land with the adequate soil pH, the solubility of metals is controlled such that these metals cannot move into the groundwater. DEP regulations require that the soil pH be maintained at 6.0 or higher, ensuring that metals do not contaminate the soil and groundwater.

As an additional precaution, DEP regulations stipulate that biosolids, other than exceptional quality, cannot be applied within 300 feet of a well or water source used for human consumption, on steep slopes or where the water table is close to the soil surface.

Can the runoff from a land application site contaminate surface water?

During the past 20 years, DEP has permitted approximately 1,500 sites for the land application of biosolids. There are currently more than 700 active permitted sites. Thus far, DEP has not encountered any adverse water quality impacts on surface or groundwater. This record supports the land application of biosolids, when properly managed, as safe to human health and the environment.

Each agricultural application site must be managed under an approved and implemented farm conservation plan. This plan provides for best farm management practices including erosion and sedimentation controls for the farm operation. In addition, biosolids cannot be applied to land that is frozen, snow-covered or flooded or has a slope greater than 25 percent.

At land reclamation sites, an approved Erosion and Sedimentation Control Plan must be implemented which provides for best practices to control storm runoff from reclamation sites.

Can germs contained in biosolids affect human health?

Biosolids are a processed product. One of the most important considerations in the production of biosolids is treatment for the reduction of pathogens. These pathogen treatment processes include digestion, high temperatures and stabilization. Moreover, when biosolids are applied to the land, conditions in the soil quickly kill pathogenic organisms that might remain.

How are biosolids regulated in Pennsylvania?

Biosolids are regulated by DEP. To land apply biosolids in Pennsylvania, the generator of the biosolids (usually a municipal wastewater treatment facility or septage hauler) must obtain a general permit from DEP. Biosolids general permits are issued for a maximum of five years, at which time they may be renewed. This permit requires the generator to demonstrate that the biosolids produced at the facility meet all the quality standards for pollutants and for reduction of pathogens and vector attraction.

The generator also must demonstrate that each application site meets strict standards for application rates, site suitability and management practices and must secure written permission from each landowner where land application is proposed. Permittees must keep detailed records of biosolids quality testing results and land application data such as agronomic loading rates and cumulative pollutant loading rates at each application site.

DEP and the U.S. Environmental Protection Agency have established quality standards for wastewater solids intended for land application. DEP's regulations include a permitting system that emphasizes biosolids quality standards and best management practices.

The quality of the biosolids is assured through product testing and monitoring to verify that the requirements for pathogen reduction, vector attraction and pollutants are met. Only by meeting the quality requirements can treated wastewater solids be considered a biosolids product that may be safely applied to the land.

Wastewater solids that do not meet these environmental standards must either be incinerated or taken to a landfill for disposal.

How frequently are the biosolids tested to ensure safety?

Biosolids must be analyzed to ensure they meet the quality standards for land application. These tests include analyses for nutrients, metals and PCBs. The frequency of testing depends on the amount of biosolids generated

by the treatment facility. Sampling frequencies range from once each month to once each year. In addition, generators must regularly monitor the treatment process. A properly operating treatment process ensures biosolids quality. Depending on the type of biosolids treatment, process monitoring may include factors such as temperature, time, pH and volatile solids reduction. DEP may sample for biosolids quality when inspecting treatment plants and application sites.

Does DEP require permit holders to have any special training?

Yes. DEP regulation requires generators and land appliers operating under biosolids permits to attend training classes. In the summer of 1998, DEP began offering a comprehensive two-day training course for all generators and appliers of biosolids. This training will continue to be conducted on a regular basis at various locations across the state.

Who is responsible if a problem develops at a land application site?

The biosolids generator holding the general permit is responsible if problems occur due to the land application of biosolids.

Are property owners notified when biosolids are applied near their property?

When a generator of biosolids plans to use a site for land application, the generator must send or personally deliver a notice to each adjacent property owner at least 30 days before the first application of biosolids to that site.

In addition, DEP will evaluate the site to see if it is suitable for biosolids application. If the site is suitable, DEP will publish a notice in the *Pennsylvania Bulletin*. If the site is not suitable, DEP will tell the permittee to fix any problems. Land application may not occur or, if in progress, must be suspended until those problems are corrected.

Is it safe to eat food that has been grown using biosolids?

Biosolids are generally used on crops that are harvested for animal feed. Nevertheless, biosolids are safe for use in growing vegetable crops. Studies undertaken by the U.S. Department of Agriculture show that crops grown in fields amended with biosolids represent no threat to human or animal health when the biosolids were used in accordance with regulatory requirements. Exceptional Quality biosolids may, in fact, be sold or distributed for use on home gardens.

DEP regulations have specific requirements concerning the appropriate waiting times following biosolids use before grazing or crop harvesting.

How are biosolids used to reclaim mining sites?

Biosolids are being used successfully at mine sites to establish vegetation where other alternatives have proven less successful. Because of geographic setting or past mining practices, mine sites have little or no topsoil. The plant nutrients and organic matter in the biosolids help to regenerate a soil layer. To accomplish this, the initial biosolids application rate at mine sites is generally higher than the agronomic rate used at agricultural sites.

In addition to the general permit required of the biosolids generator, DEP requires special approval to allow land application under a mining permit or permit modification. The land application of biosolids for each mine reclamation site must follow the site restrictions and management practices required by the general permit.

For more information, visit www.dep.state.pa.us, keyword: Biosolids.