

Regulation and Beneficial Use of Biosolids

Pennsylvanians produce an estimated 2.2 million tons of sewage sludge and residential septage, each year, nearly a quarter of a ton per household. This material has proven to be a valuable resource, when controlled and safely applied, as a fertilizer to help rejuvenate farmland, forests, and mine lands.

The regulations were developed after extensive studies by the U.S. Environmental Protection Agency (EPA) and public review in Pennsylvania found land application is environmentally safe and beneficial to the soil. The biosolids regulations have been endorsed by the Solid Waste Advisory Committee, the Pennsylvania Water Environment Association and the Pennsylvania Septage Management Association. Biosolids that do not meet the environmental standards must either be incinerated or taken to a landfill for disposal.

What are Biosolids?

Biosolids are nutrient-rich organic material produced from the stabilization of sewage sludge and residential septage that meet specific quality criteria and are suitable for land application. Residential septage is human or household waste in a liquid or solid form removed from septic tanks or cesspools. The nutrient content of residential septage is similar to sewage sludge and, when treated and processed, can also be beneficially land applied as biosolids.

Some biosolids are land applied as a liquid, while others have water removed from them and are the consistency of wet soil. Other biosolids are in the form of compost material and pellets.

Regulations require that industrial facilities pretreat wastewater to remove many hazardous contaminants before it is sent to a wastewater treatment plant. Wastewater treatment facilities then monitor incoming wastewater streams to ensure that the quality of the wastewater meet the pretreatment standards.

Once wastewater reaches the treatment plant, it goes through physical, chemical, and biological processes which clean it and remove the solids. The collected wastewater solids then undergo extensive stabilization treatment to reduce odors, pathogens (disease-causing organisms), and vector attraction (characteristic of the wastewater that attracts rodents, flies, mosquitoes, etc.). Stabilization treatment includes such processes as digestion, lime stabilization, pasteurization, and composting.

The application of biosolids reduces the need for commercial fertilizers. Recycling biosolids instead of disposing of them saves landfill space and can save farmers and communities money.

Agricultural Recycling

Biosolids applied at approved rates help improve crop growth and yield, according to studies done by The Pennsylvania State University and others. Nutrients found in biosolids, such as nitrogen, phosphorus, and potassium and trace elements such as calcium, copper, iron, magnesium, manganese, sulfur, and zinc, are necessary for crop production and growth. The organic nitrogen found in biosolids is used very efficiently by crops because it is released slowly throughout the growing season. This enables crops to absorb the nutrient as they grow. This efficiency lessens the likelihood of nitrogen pollution in groundwater.

Biosolids reduce the farmer's production costs and replenish the organic matter that has been depleted over time. The organic matter improves the soil by increasing its ability to absorb and store moisture.

Mine Reclamation Recycling

Biosolids also have been used successfully at mining sites to help reestablish vegetation. The organic matter and plant nutrients in biosolids regenerate the soil layer. Biosolids are especially helpful in restarting plant growth at abandoned mine sites where there is very little or no topsoil.

Forestry Recycling

Biosolids have been found to help timber grow. In the same manner that biosolids help crops to grow, they also provide nutrients to our forests. Biosolids help forests grow more quickly and more efficiently.

Home Recycling

If treatment requirements are met to produce exceptional quality (EQ) biosolids, they are considered landscape grade and may be sold or distributed for use on lawns and home gardens. EQ biosolids must meet the most stringent standards for metal concentrations, pathogen reduction treatment, and vector attraction reduction. This ensures the greatest level of protection to public health and the environment. EQ biosolids also must be non-liquid

and cannot be recognizable as human waste. Many homeowners and commercial appliers use composted, heat-dried, or other forms of EQ biosolids on gardens, flowerbeds, golf courses, and city parks.

How are Biosolids Safely Land Applied?

The organic matter in biosolids improves soil suitability for crop growth and water-holding capacity. When biosolids are applied to soil with a minimum pH of 6, the risk imposed by the movement of metals into groundwater or uptake by crops is insignificant.

Before being used, biosolids are analyzed to ensure they meet Department of Environmental Protection (DEP) and EPA standards. They are analyzed for pathogens, nutrients, PCBs (*polychlorinated biphenyls*), and metals.

Unless they meet EQ standards, biosolids applied to a particular site first must be evaluated by the biosolids generator for proximity to water supplies, soil characteristics, slopes, vegetation, crop needs, and the distances to surface and groundwater.

Then the agronomic rate, or rate necessary to meet the nitrogen requirement for crops to grow, must be determined to ensure the appropriate quantity of biosolids are applied to the land. The biosolids application rate is specifically calculated to match how much nutrients the particular crop requires and cannot be exceeded.

Biosolids generators and appliers are actively encouraged to seek public involvement early in the land application process and to include and consider landowners and residents throughout the process. Pennsylvania residents are vital partners in the proper management and ultimate success of biosolids recycling. For more information, see the fact sheet, "Understanding Biosolids Land Application in Your Community".

What is the Impact on Human Health and the Environment?

EPA and other scientific experts have examined how the biosolids could directly or indirectly affect human health and the environment, including groundwater, air and soil quality, and surface water runoff, and established minimum safe concentrations for biosolids to be land applied. DEP's regulations require biosolids to meet very stringent standards for the elimination of disease-causing organisms; the reduction of conditions that may attract flies and other disease-carrying organisms or cause odor problems; and the control of maximum metals concentration.

How are Biosolids Regulated?

DEP's regulations for biosolids have been revised to make sure that biosolids meet strict quality standards and can be safely applied to the land. Anyone who generates biosolids, including wastewater treatment plants and septage haulers, must get a permit from DEP before biosolids can be applied to the land. The permit identifies pollutant limits, general requirements, management practices, site restrictions, and follow-up monitoring and reporting requirements. Biosolids permits are issued for a maximum of 5 years.

DEP requires biosolids generators and land appliers to complete training courses. This training is necessary to ensure regulatory compliance.

Written permission from each landowner must also be secured before biosolids can be applied to the land. Biosolids permits require applicants to submit landowner consent forms and to carry out adjacent landowner notifications. In addition, the permittee must notify DEP and the appropriate county conservation district 30 days before land application occurs at a site for the first time.

When DEP receives this notice, it 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. The generator may land-apply after 30 days, even if DEP has not yet made an evaluation. However, if problems at the site are found upon evaluation, application must be suspended until those problems are corrected.

The permittee must prepare and provide the occupant of the land, 7 days prior to the land application activity, an instruction sheet describing uses and restrictions at the site. The trucks carrying the biosolids must display the permit number. Land application equipment must display the permit number.

For more information, visit www.dep.pa.gov/biosolids.