

Testimony for House Environmental Resources and Energy Committee
Trudy Johnston, President Material Matters
October 14, 2014

As a biosolids consulting firm, Material Matters recognizes the critical necessity of having multiple options available for disposition of biosolids in Pennsylvania; particularly application to the land. Biosolids land application is a heavily regulated program; by both EPA and PADEP. Questions raised regarding the science of biosolids land application have been, and will continue to be addressed by a multitude of academic researchers, at mainstream institutions including Penn State University, Drexel, Bucknell, and others across the nation. (<http://www.nebiosolids.org/index.php?page=science>)

Municipal government considers wastewater treatment and biosolids processing and management as an important responsibility as environmental stewards. In fact, trends in thinking consider wastewater treatment as resource recovery; with the goal to recover energy, nutrients, organic matter, and clean water. These goals clearly include beneficial use of biosolids as nutrient and organic matter resources.

My testimony will cover the following points.

1. Application of biosolids to the land has a long tradition in Pennsylvania dating back to the early 1970s.
2. Municipal wastewater treatment plants employ a variety of methods to process and manage biosolids in an environmentally sound manner.
3. Biosolids end use is commonly the 2nd largest budget line item in a municipal wastewater treatment plant (WWTP) budget; second only to energy.
4. Beneficial use of biosolids has positive environmental benefits and is an excellent option to preserve, as well as landfill and incineration.

Biosolids land application has a long tradition in Pennsylvania.

Biosolids have been land applied in Pennsylvania for over 40 years, with the first permits issued in the early 1970s. The early standards for the program were based on research conducted by Dr. Dale Baker and Dr. William Sopper at Penn State University. Annville Township Authority held one of the first permits to land apply biosolids on 500 acres surrounding their WWTP. Since that time, biosolids have become one of the most studied materials, and are heavily regulated under EPA and PADEP rules.

Pennsylvania biosolids generators are regulated by both EPA and PADEP rules. The current set of EPA regulations was promulgated in 1993, with technical standards established by EPA over the course of decades. PADEP regulations incorporate the EPA technical standards, with additional safeguards such as; more restrictive buffers, notification to neighbors, nutrient management and conservation planning, and more detailed recordkeeping and reporting.

Over 300,000 dry tons (or 1.2 million wet tons) of biosolids are generated in Pennsylvania each year from municipal wastewater treatment plants (Elliott, 2007). Options for biosolids management include land application, landfilling, and incineration. Nearly 40% of the biosolids generated in Pennsylvania are land applied, 45% landfilled, and 15% incinerated (Elliott, 2007). This compares to a national land application rate of 55% (NEBRA, 2007).

Approximately 480,000 wet tons of biosolids are land applied annually in Pennsylvania. Compare that to the approximately 25.2 million wet tons of manure that is produced and managed in Pennsylvania each year. Biosolids represent less than 2% of the total volume of manures generated, and less than 1% of the nutrients from manures. Because biosolids are closely regulated, they cannot be applied to farms with excess nutrients, which ensures careful management of farms where biosolids are applied.

Municipal wastewater treatment plants use various methods and technologies to process biosolids to meet regulatory standards.

There are over 700 WWTPs in Pennsylvania, making Pennsylvania only 2nd to Texas in the number of treatment plants (Elliott, 2007). Processing methods and technologies include a variety of Class B and Class A/EQ process such as; aerobic and anaerobic digestion, lime stabilization, drying beds, composting, ATAD, thermal drying, and incineration. Note that all biosolids must meet pathogen standards prior to land application or landfilling.

Biosolids beneficial uses in Pennsylvania include farm application, mine reclamation, biomass production, and distribution as fertilizers to farmers, turf producers, soil blenders, and fertilizer blenders. For example, the Borough of Mechanicsburg recently constructed a compost facility where they produce biosolids compost that will be sold to consumers and soil blenders.

The largest wastewater treatment facilities continue to participate in land application. Both ALCOSAN and the Philadelphia Water Department land apply a majority of their biosolids. Other large generators, such as Allentown, Altoona, and Harrisburg have robust Class B land

application programs. Also, a majority of treatment plants that land apply tend to be in the south central portion of the state, with the eastern portion of the state gradually shifting toward land application.

Trends in Pennsylvania show that medium sized wastewater treatment plants are moving towards Class A/EQ. Currently, approximately 15 WWTPs are using Class A/EQ technologies. However, Class B land application programs remain the largest beneficial use programs.

Biosolids end use is typically the 2nd most costly line item in a municipal wastewater treatment budgets, second only to energy.

Decisions on selection of processing, technologies, and end use methods are generally driven by cost. However, other factors are also considered such as; risk, reliability, regulations, liability, flexibility, and public acceptance (Elliott, 2007). Biosolids processes and technologies are very different relative to capital and operating costs, ease of operation, and complexity.

Generally, land application programs are the most cost effective programs. Prices range from \$20 to \$32 per wet ton for self-managed programs and \$34 to \$50 per wet ton for contracted land application programs. Landfilling is generally more expensive in the eastern part of the state and less expensive in western Pennsylvania. Prices range from \$30 per wet ton in western Pennsylvania to over \$100 per wet ton in eastern part of the state. However, there remain a number of WWTPs in the east that continue to landfill at costs ranging from \$80 to over \$100 per wet ton.

The City of Harrisburg (now Capital Region Water) is an example of a municipal wastewater treatment program that moved from landfill to land application in order to save close to \$500,000 per year. Landfill was costing the City close to \$60 per wet ton to dispose of over 13,500 wet tons per year. A self-managed land application program was developed with current costs of just over \$30 per wet ton, resulting in cutting costs by half.

Incineration is reported to range from \$55 to \$90 per wet ton (Elliott 2007). However, recent changes to air emissions rules for incinerators (SSI) is requiring existing incinerators to expend large capital outlays to upgrade to the meet the air quality standards. Once these existing incinerators have outlived their useful life, they will be faced with extremely large capital costs for replacement as new incinerators must meet tough new air emission standards. As an example of concerns about replacement of incinerators, 2 municipalities are implementing beneficial use programs to manage a portion of their biosolids to extend the life of their incinerators.

Beneficial use programs have positive environmental benefits.

There have been numerous academic and institutional studies that confirm the safety of biosolids land application. In fact, the biosolids community continues to participate in research as questions about biosolids quality, stability, and health and environmental effects are raised. In my 30 years of involvement with biosolids management, there has always been significant support for research to address each and every challenge.

Testimony for House Environmental Resources and Energy Committee
Trudy Johnston, President Material Matters
October 14, 2014

As previously noted, there are three options for biosolids management; land application, landfill, and incineration. Biosolids generators select end use options based on a variety of factors making continuation of each one important to municipal agencies. However, from an environmental perspective, landfill is one of the largest generators of greenhouse gas (GHG) emissions. Organic materials decompose under anaerobic conditions in the landfill and generate methane and carbon dioxide. Understandably, many states are banning biosolids and other organic materials from landfills for this reason. Incineration uses large volumes of energy to combust biosolids, which are generally not self-heating (more energy to burn than provided from biosolids).

Land application provides a source of nutrients and organic matter when applied to the soils. The nutrients in biosolids replace other fertilizers that are environmentally costly to produce. Land application also preserves carbon that is part of biosolids and recycles it back into crops and soil organisms.

An example of an excellent biosolids recycling program that considers energy, nutrients, and preserves carbon is the Derry Township Municipal Authority's (DTMA) biosolids program. DTMA anaerobically digests their solids to generate methane that is used to power a generator; the heat is used to dry biosolids, which are then sold to farmers to replace fertilizers they would typically purchase. These are the types of programs the Pennsylvania House of Representatives may want to examine and support as an example of future trends in biosolids processing and management in Pennsylvania.

References

Elliott, H.A., R.C. Brandt, J.S Shortle. 2007. Biosolids Disposal in Pennsylvania: Cost Comparison and Policy Consideration. Center for Rural Pennsylvania, Harrisburg PA.

North East Biosolids and Residuals Association (NEBRA). 2007. A National Biosolids Regulation, Quality, End Use, & Disposal Study. Final Report. www.nebra.org.

Trudy Johnston is President of Material Matters, an environmental consulting firm specializing in developing solutions for processing and disposition of biosolids, and industrial, residual, and food processing materials. She has over 32 years experience in municipal wastewater treatment, and biosolids consulting relative to processing and management. Trudy is President of the Mid-Atlantic Biosolids Association and Secretary of the Central Pennsylvania Water Quality Association. She holds a BS in Earth Science from Penn State University.