

How and Who Regulates the use of Biosolids

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Introduction

Biosolids are regulated at the federal, state, and local level to ensure protection of public health and the environment. Regulations prohibit land application of untreated sewage sludge but allow the application of appropriately treated biosolids which will not cause adverse effects on human health or the environment. To determine that a biosolids product is appropriately treated, wastewater treatment plants (WWTP) have to meet standards for pathogen (bacteria, viruses, parasites) reduction, vector (insect or rodent that can transmit disease) attraction reduction, and pollutant concentration. This document provides information about how biosolids land application is regulated in Virginia by the federal, state, and local governments.

Federal

As required by the Clean Water Act, the U.S. Environmental Protection Agency (EPA) established The Standards for the Use or Disposal of Sewage Sludge (Title 40 of the Code of Federal Regulations, Part 503) in 1993. The Part 503 rule establishes pathogen and pollutant limits in biosolids, and minimum requirements of biosolids quality when applied to different types of lands (e.g., agricultural, forested, urban) to ensure that pathogens and metals are kept below specified levels to protect human health and the environment.

Federal regulations require the reduction of pathogens and vector attraction of biosolids. These are achieved through chemical and biological treatment process (see Wastewater Treatment Processes fact sheet). Based on pathogen reduction levels, there are two types of biosolids that can be land-applied: Class B and Class A. Class B biosolids are produced by Processes to Significantly Reduce Pathogens (PSRPs), which result in products containing very low pathogen concentrations that will unlikely cause adverse effects on public health and the environment. Because Class B biosolids contain some pathogens, site restrictions are required. These are imposed to minimize the potential for human and animal contact with the biosolids until environmental factors (temperature, moisture, light, microbial competition) reduce the pathogens to below detectable levels. Class A biosolids are produced by Processes to Further Reduce Pathogens (PFRPs). Class A biosolids have undetectable pathogen levels and can be applied based on soil nutrient recommendations like any other organic amendment.

Vector attraction reduction is commonly achieved at WWTP by processes that reduce biologically active organic matter whose characteristics can attract rodent, bird, and insect vectors or at land application sites to prevent vectors from coming into contact with the biosolids. Of the ten options that meet vector attraction reduction goals, eight methods reduce the attractiveness of biosolids to vectors with specified organic matter decomposition processes (e.g., aerobic or anaerobic digestion) and two application options (i.e., biosolids incorporation or injection) to prevent vectors from contacting biosolids in the field.

In addition to pathogen and vector attraction reduction, the Part 503 rule prohibits the application of biosolids that exceed certain limits for priority pollutants, which are the trace elements arsenic (As), cadmium (Cd), copper (Cu), lead (Pb), mercury (Hg), molybdenum (Mo), nickel (Ni), selenium (Se), and zinc (Zn). If trace element concentrations exceed "Ceiling Concentration Limits" (CCL), or the maximum concentration allowed, then the products are not considered biosolids and cannot be used beneficially. If more stringent "Pollutant Concentration Limits" (PCL) are met for each priority pollutant, then biosolids lifetime loading rates are unlimited. Biosolids require tracking of and impose limits on the cumulative elemental loadings of those priority pollutants that exceed the PCL to ensure protection

of public health and environment. Such loading rate restrictions are termed “Cumulative Pollutant Loading Rates” (CPLR). Biosolids that meet both PFRP (i.e., Class A) and PCL standards are considered to be of Exceptional Quality (EQ) and can be applied unrestricted except at rates established for proper nutrient management.

Under federal regulation, biosolids can only be applied at or less than the agronomic nitrogen (N) rate which is the amount of N needed for adequate plant growth. Applying biosolids at this rate not only supplies enough N for plant growth, but also helps minimize the risk of groundwater contamination. If soil phosphorus (P) levels are high and there is a risk of P runoff, then biosolids must be applied at an agronomic P rate or not applied at all.

Finally, organic chemicals are not regulated under the Part 503 rule because many of the organic chemicals of concern 1) have been banned for use and manufacturing in the USA; 2) have been detected at very low concentrations or at only a few of the biosolids samples tested; and 3) the organic chemical identified is unlikely to exceed its limit after biosolids land application (U.S. EPA, 1990; U.S. EPA, 2009).

State

Every state must follow federal regulations of the Part 503 rule, but each state may also adopt its own regulations that must be at least as strict as the federal regulations of the Part 503 rule.

The Virginia Biosolids Use Regulations (12 VAC 5-585, 32.1-164.5 of the Code of Virginia) were developed by the Virginia Department of Health (VDH), but the Virginia General Assembly transferred oversight of the regulations and permits to the Virginia Department of Environmental Quality (DEQ) in 2008 ([§ 62.1-44.19:3 of the Code of Virginia](#)). Thus, compliance with land application regulations of biosolids in Virginia is now regulated by the DEQ via the Virginia Pollution Abatement (VPA) permit regulation ([9 VAC 25-32](#)) and the Virginia Pollutant Discharge Elimination System (VPDES) permit regulation ([9 VAC 25-31](#)). State regulations require biosolids to meet pathogen reduction, metal concentration limits, and vector attraction reduction as established by the Part 503 rule. However, some of the additional specific requirements for Virginia include:

- Permits that must be obtained by owners of wastewater treatment facilities for the land application of biosolids, which comprise both VPA and VPDES Permit Regulations.
 - It's important to highlight that the DEQ permit process provides the opportunity for public involvement by holding public meetings to provide information to residents, by allowing residents to submit written comments to DEQ, and by holding public hearings if more than 25 qualifying requests for hearings are received ([§ 62.1-44.15:02 of the Code of Virginia](#)). Public input can help modify permits (JLARC, 2018).
- Specific procedures and nutrient management plans for biosolids land application.
- Soil monitoring, site management, sampling, analysis, record keeping, and reporting in connection with land application and distribution of biosolids.
- Determining the suitability of a site for land application.
- Notice local government 100 days prior to biosolids application.
- Ensuring quality of biosolids before land application.
- Investigating the activities and operation of WWTP following complaints.
- Enforcement actions if regulations are not followed.

The Virginia DEQ also requires the preparation of biosolids nutrient management plans according to Virginia Department of Conservation and Recreation (DCR) criteria. Nutrient management plans must be site-specific and developed by a certified nutrient management planner. Where biosolids are to be applied on land associated with

animal feeding operations, soils with high phosphorus, or at certain rates and frequencies, DCR must approve the nutrient management plan prior to land application of biosolids. The DCR requires that the Virginia Nutrient Management Standards and Criteria, revised October 2014, and other applicable DCR guidance documents are used to determine biosolids application rates, and Section 4 VAC 5-15-150.A.4 of the Nutrient Management Training and Certification Regulation is used to determine appropriate biosolids application times (Virginia DCR, 2011 and 2014). These documents establish that (Virginia DCR, 2011):

- Soil samples must have been analyzed in the last three years for pH, phosphorus, potassium, calcium and magnesium prior to biosolids land application. Soil monitoring before biosolids application is important in order to identify and control any buildup of soil P, maintain agronomic pH, and identify nutrient deficiencies that would inhibit plant growth and uptake of the nutrients in biosolids.
- Biosolids application rates must be based on biosolids nutrient analysis.
- Biosolids must be applied at or near planting or to actively growing crops to maximize plants nutrient uptake and minimize nutrient loss.
- Biosolids applications should be avoided in the late fall-winter, and in environmentally sensitive areas (i.e. shallow soils, floodplains, slopes greater than 5%).
- Minimum distances and buffers must be implemented if biosolids are going to be applied near wells, springs, surface waters or sinkholes.

While Virginia DEQ largely focuses on compliance of appropriate biosolids land application through permitting and inspections, the Virginia Department of Agriculture and Consumer Service (VDACS) regulates biosolids as fertilizer, soil amendments, horticultural growing media or liming materials through product registration and manufacturing licensing. These licensing and product registration requirements ensure that biosolids sold and distributed across the State are safe to use and beneficial to soil or crops. Under the authority of the Virginia Fertilizer Law (3.2-36 of the Code of Virginia) and the Virginia Agricultural Liming Materials Law (3.2-37 of the Code of Virginia), VDACS can require wastewater treatment plants to submit product data necessary to assess the product's benefit and potential deleterious effects for its intended use. This assessment by VDACS is necessary prior to issuing a license for biosolids to be distributed in the Commonwealth as one of the products regulated by the Agency. The guideline for approving industrial co-products requires wastewater treatment plants to submit: 1) the results of chemical (nutrients, metals, and other chemicals of concern) analysis of the product, 2) intended use, 3) description of potential sites of application, and 4) frequency of application (VDACS, 1994 <http://www.vdacs.virginia.gov/pdf/fert-industrial-products-guid.pdf>). Researchers from Virginia Tech review analytical results of biosolids products and, if necessary, conduct further testing (laboratory analyses, and/or greenhouse, and/or field) on the product in order to approve or deny product registration and recommend label uses and restrictions. Once the product has been approved for use, VDACS will request annual product analyses to ensure the properties remain consistent. Chemical analyses and testing fees are paid by the biosolids product or co-product generator.

In total, the Virginia agencies DEQ, DCR, VDH, and VDACS, along with Virginia Tech, establish and implement programs to train people that perform, test and monitor the land application of biosolids. Such trainings include: 1) instruction on the Virginia biosolids regulations, 2) processes for the production, preparation, and application of biosolids, 3) sampling and chain of custody control, 4) implementation of nutrient management plans, 5) enforcement authority procedures, among others.

Local

Local governments in Virginia can allow additional inspections and monitoring of lands that have received biosolids applications on sites under Virginia DEQ regulations. Local governments that develop an approved biosolids use ordinance can receive state funds to hire personnel to provide further monitoring of application sites. However, local regulations other than those for routine biosolids storage cannot be stricter than regulations established at the State level. The local government is only meant to supplement enforcement of Virginia regulations (JLARC, 2018).

References

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