

Biosolid Applications to Mississippi Soils



Industrial by-products are often land applied to provide nutrients and organic matter for growing crops and for other soil amendment purposes. Categories of by-products include municipal biosolids, drinking water residuals, by-product gypsum, poultry processing residuals, pulp and paper lime mud, and boiler ash.

The municipal biosolids have been treated to stabilize organic matter and reduce pathogens; they are not raw sewage. Often other solid wastes become available to growers and may be land applied. This publication addresses the environmental rules and regulations for land applying these by-products in the state of Mississippi. The requirements may differ in other states.

Land application of animal wastes are addressed by Mississippi Department of Environmental Quality (MDEQ) water quality permits that follow nutrient management plans usually developed in Mississippi by the Natural Resource Conservation Service (NRCS) for submission to MDEQ for review. Those plans follow best management practices as described by the NRCS Conservation Practice Standards.

Biosolid Classes and Permits

The permitting agency for land application of solid waste in the state is MDEQ. The pathways to permitting as a soil amendment for either fertility or soil conditioning depend on the properties of the material. Regulations define biosolids as treated municipal sewage sludge with potential land application uses as either Class A or Class B.

- **Class A:** Typically defined as “exceptional quality” biosolids with low metal contents, low or no pathogen levels, and little risk of odor issues or attracting pests.
- **Class B:** These biosolids may have a higher pathogen content, but meet minimum regulation requirements, and can be used to fertilize crops or as soil conditioners.

Materials not prone to creating odors or other nuisances may be applied under a beneficial use determination (BUD) that can be requested by the material generator, an entity distributing it, or the end-user. A beneficial use determination is a conditional exemption for the specific uses of a nonhazardous by-product. The BUD

process has been used for some paper mill by-products, wood-fired boiler ashes, and other non-putrescible materials.

If a material is putrescible or malodorous, or has other potential issues of concern, such as elevated concentrations of potentially toxic elements or other contaminants, a site-specific solid waste permit will be required, as do Class B biosolids.

However, if the biosolids are categorized as Class A, the entity generating or distributing them may request a Beneficial Use Determination that is not site specific prior to land applications. Approved BUD materials may then be spread for agricultural use under recommended application guidelines without a site-specific permit. In tandem with the BUD, the distributing party will likely need approval from the Mississippi Department of Agriculture and Commerce with regard to the nutrient value of the material.

Class B biosolid applications may proceed if requested under the statewide general permit, or through an individual permit for a specific site. The individual, site-specific permit is suitable if the proposed location has conditions or needs that should be addressed with an individual permit or if the proposed facility has a significant degree of public interest.

Permitting requirements may vary for land application of other nonhazardous materials, but there must be a benefit to the receiving soils. This is an important point for producers and landowners, as proposed land application activity could be considered a disposal activity if there is no positive agricultural benefit.

Biosolid Permit Requirements

General permits are issued by the Mississippi Department of Environmental Quality when there are groups of similar facilities or activities that present comparable environmental impacts and have similar management requirements.

Currently the only general permit that has been issued for land application of solid wastes in Mississippi is the Statewide General Permit for Biosolids Land Application Sites. The BLA general permit contains operational, monitoring, and reporting requirements for biosolids land application. Any applicant interested in land applying

biosolids may apply for permit coverage under the statewide general permit, unless it is determined that an individual permit, a BUD, or another potential exemption is deemed more appropriate.

These sludges are generally to be applied on the permitted site on the delivery date and soil incorporated or subsurface injected, unless otherwise approved. Application of the material must be conducted safely above the water table and is restricted from the floodway or within a 100-year flood plain between the months of November and April.

Applications are to be set back 300 feet from inhabited residences, 200 feet from the property line, and 250 feet from the edge of surface waters, unless specifically approved. They are not to be applied on delineated wetland areas unless approved by the Army Corps of Engineers and/or the Natural Resource Conservation Service.

The frequency of sludge analysis depends on the quantity applied at a site each year unless otherwise negotiated with MDEQ. Maximum application rates depend on the crop to be grown and are based on the maximum plant-available nitrogen applied (pounds per acre per year). Deviation of rates due to double-cropping require MDEQ preapproval.

The concentration limits and lifetime loading rates of various metals to soils are set by Code of Federal Regulations Title 40, Part 503.

Ceiling concentration limits are the maximum concentration of each pollutant allowed in biosolids considered for land application. If the concentration exceeds this limit, the material cannot be land applied.

The cumulative pollutant loading rate is the maximum amount of a pollutant that can be applied to a site over its lifetime by all applications meeting ceiling concentration limits. Application of the biosolid must be stopped when any one of the pollutants reaches its maximum cumulative loading rate. The pollutants of concerns and their ceiling concentrations and cumulative loading rates are listed in Table 1.

Soil must be monitored each year that sludge is

Table 1. Concentration and loading limits for elemental pollutants in Mississippi biosolids.

| Pollutant | Ceiling Concentration mg kg ⁻¹ (= ppm) | Cumulative Pollutant Loading Rates (Pounds per acre) |
|------------|--|--|
| Arsenic | 75 | 36 |
| Cadmium | 85 | 34 |
| Copper | 4300 | 1338 |
| Lead | 840 | 267 |
| Mercury | 57 | 15 |
| Molybdenum | 75 | |
| Nickel | 420 | 374 |
| Selenium | 100 | 89 |
| Zinc | 7500 | 2497 |

Developed from Code of Federal Regulations Title 40, Part 503 (40 CFR, Part 503).

Note: The annual application rate of cadmium is to never exceed 0.45 pounds/acre/year, unless preapproved. Molybdenum, copper, nickel, and zinc are essential for plant growth in trace amounts. See [MSU Extension Information Sheet 1038 Micronutrients in Crop Production](#) for more information about nutrient bioavailability.

applied either after the final application of the year or an otherwise previously approved schedule. Required analyses are pH, nitrate, total arsenic, total cadmium, total copper, total lead, total mercury, total nickel, total selenium, total zinc, and fecal coliform. Soil pH must be maintained at 6.5 or greater in the absence of specific authorization otherwise.

The permit holder must maintain records of sampling information, including who took them, when analyses were performed, laboratory used, analytical methods, and results. Records must be kept of the date and field areas where applied, the quantity and source of the biosolid, and the crops grown. Any contracts between permittee and contracted operators must be provided to MDEQ upon request. Annual reports are due to the agency by February 28 of each year for the preceding calendar year.

This information solely pertains to land application of biosolids in Mississippi. However, some of these requirements may also be applied to certain industrial sludges when determined appropriate. For more information, contact the Waste Division of MDEQ.

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