## The 503s

The Part 503 rule sets minimum quality standards and dictates proper management practices for all sewage sludge that is used or disposed of through land application, surface disposal, and incineration. Many states have more stringent rules.

The rule establishes national baseline pollutant limits for metals and operational standards for pathogens and vector attraction reduction. The 503s include requirements for monitoring, recordkeeping, and reporting and set forth management practices for the safe handling and use of biosolids. Ironically, while biosolids are more heavily regulated than livestock manure and commercial fertilizers, both can cause water quality and environmental problems if not properly managed.

The 503s are the product of a comprehensive and unprecedented effort to assess the potential for pollutants in sludge to adversely affect public health and the environment through a number of different routes of exposure. Research results and operating experience over the past 25 years have greatly expanded EPA's understanding of the risks and benefits of using or disposing of biosolids.

During this risk assessment process, the data, models, and assumptions used were reviewed and revised in a cooperative effort that involved a group of internationally recognized experts working closely with EPA. The Agency feels that this process has resulted in the establishment of state-of-the-art, risk-based standards for controlling the use or disposal of biosolids.

The Part 503 rule includes measures regarding the proper testing and application of biosolids. Landowners (including their lenders) and leaseholders who use biosolids beneficially as a fertilizer substitute or soil conditioner in accordance with the rule are protected from liability under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as well as any enforcement action from EPA under the Part 503 Rule.

## Managing Biosolids for Beneficial Uses

Every day millions of gallons of wastewater containing human and household wastes are piped through sewer systems to municipal treatment facilities. During treatment, solid, semi-solid, and liquid residues, or sludges, are removed from the wastewater. These sludges are composed of water, organic matter, nutrients, such as nitrogen, phosphorus, calcium, and magnesium, and micronutrients such as zinc and iron. Over the past several years, the quality of municipal sludges has improved considerably, partly due to the enforcement of federal, state, and local regulations and partly due to pretreatment standards that indirect dischargers, such as industries, must comply with before they can send their wastewater to public facilities for final treatment.

Communities can manage their biosolids for beneficial use in a number ways. Technologies that allow for the beneficial use of biosolids are proven, and markets for such products are expanding rapidly.

The term "exceptional quality" (EQ) is a category that was developed by EPA to characterize biosolids that may be used in beneficial use programs without a lot of regulatory oversight. EQ biosolids are considered to be of sufficient quality for use in a broad range of applications. Technologies such as composting, heat drying, and alkaline stabilization can produce an EQ material if they meet specific 503 pathogen, metals, and vector attraction requirements.

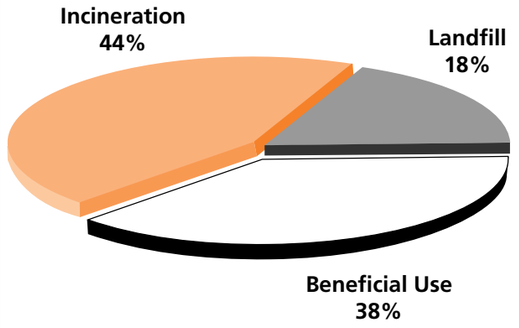
## Typical Beneficial Treatment Processes

- **Land Application** is the the application of biosolids to land to either condition the soil or to fertilize crops or other vegetation grown in the soil. Biosolids can be land applied by spraying or spreading the treated sludge onto the land surface or by incorporating or injecting the material into the soil.
- **Composting** is a method that accelerates natural decomposition processes under controlled conditions prior to land application. The sludge is dewatered, mixed with a bulking agent (e.g., wood chips, leaf and yard waste, wood ash), and allowed to decompose aerobically for a period of time. Proper composting results in a quality, marketable product that is virtually pathogen-free and soil-like in texture and odor.
- **Heat Drying** is a high-tech process in which sludge is physically dried prior to land application. This process may incorporate "pelletization," where sludge is heat-dried into pellets that can be marketed.
- **Alkaline Stabilization** is a process wherein sludge is blended with a high pH material, such as kiln dust or quick lime. The material undergoes a chemical reaction whereby it is pasteurized by raising pH and temperature. The process significantly reduces pathogens and yields a marketable lime substitute for land application which can be useful for New England's acidic soils.

### Beneficial Uses for Biosolids

- **Farmland** - for the production of a wide range of crops. Biosolids help build up soils and can serve as a partial replacement for expensive chemical fertilizers and, in some cases, a lime supplement.
- **Forest Land** - to enhance forest productivity and to condition soils in reforestation projects.
- **Turf Farms** - to build up organic matter on fields where topsoil is lost with each cropping.
- **Land Reclamation Projects** - to build up barren soils in areas such as abandoned sand and gravel pits.
- **Vegetative Cover for Landfill Closure** - instead of stripping soil from farm fields, create a sludge-based loam.
- **Public Works Projects** - along highways, in parks, on airport runways.
- **Landscaping Projects and Golf Courses.**

### Sewage Sludge Use and Disposal in New England, New York, and New Jersey




## Sludge Disposal Options

**Incineration** is the firing of sewage sludge at high temperatures in an enclosed device. This process reduces the sludge to a mass of ash that is less than 20 percent of its original volume. Sludge incineration eliminates some environmental and health problems by destroying pathogens and potential toxic organic chemicals.

**Surface Disposal** is the placement of sewage sludge in locations, such as sludge-only landfills, dedicated land surface disposal sites, piles, mounds, or impoundments, for final disposal.

**Co-Disposal** is essentially landfilling sludge with municipal solid waste. With this option, sludge is regulated for final disposal as a solid waste. New landfills, however, are becoming costly and must be lined, monitored, and have leachate collection, treatment, and disposal systems.

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October 2001



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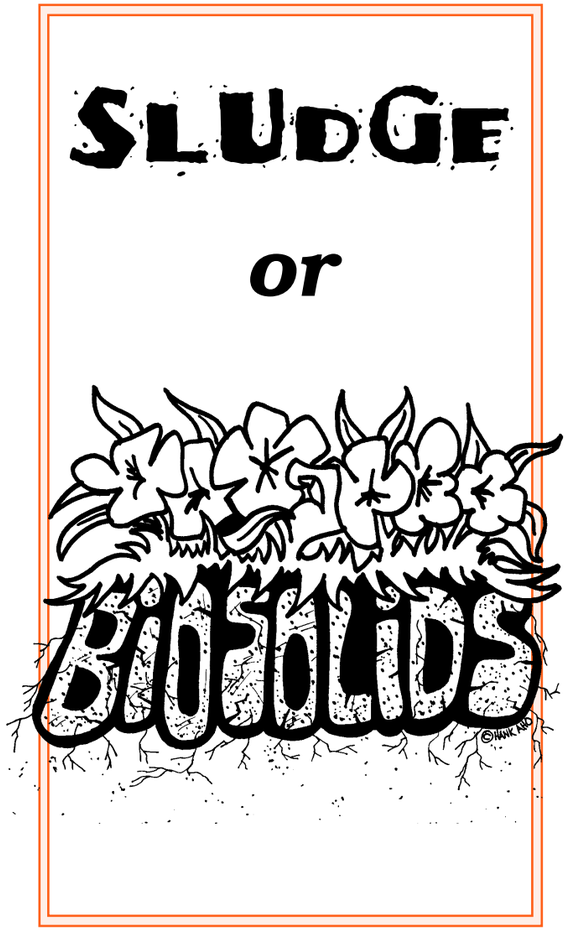
*Biosolids are a Natural Resource!*





*This fact sheet was funded through a grant from EPA-New England to the New England Interstate Water Pollution Control Commission (NEIWPCC). The fact sheet was prepared by NEIWPCC's Residuals Workgroup, which is comprised of the state sludge coordinators from the Northeast states.*

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## A Residual of Worth

***Sludge*** is an organic solid, semi-solid, or liquid by-product of the wastewater treatment process. Sludge characteristics vary depending on each treatment facility's wastestream and the processes that are used. Sludges that meet EPA standards, for beneficial use are referred to as ***Biosolids***. Like animal wastes, biosolids are a part of the natural cycle of life. They have nutrient and soil-enhancing properties that make them a practical choice for a variety of beneficial uses.

Although there has been significant research on the beneficial use of biosolids, and history has demonstrated, in the United States and other regions of the world, that high quality biosolids can be beneficial soil additives and plant nutrients when properly applied, concerns still exist. These concerns relate primarily to the quality of the biosolid material and its impact on soil productivity, groundwater, surface water, and adjacent land uses.

To ensure that sludges that are used as biosolids are treated and managed in a manner that protects both human health and the environment, Congress directed EPA to develop a comprehensive national Sewage Sludge Program aimed at reducing risks and maximizing the beneficial uses of sludge. In February of 1993, EPA issued its sewage sludge use and disposal regulation, 40 CFR Part 503, commonly referred to as the "503s."

The Northeast States, NEIWPCC, and the EPA believe that, when managed and applied properly, biosolids can be valuable resources. With the phaseout of unlined landfills, the federal ban on ocean dumping, and growing public awareness of environmental issues, communities have begun to recognize that biosolids can be a resource and not a waste. Many communities have discovered viable, safe, and environmentally sound options for the beneficial use of their biosolids. Some communities have implemented a single beneficial use method, some employ different sludge use and/or disposal methods in combination, others have entered into regional solutions or contracted with privately-owned facilities. In choosing an option, communities must consider cost, odor control, and siting issues.