BIOSOLIDS RECYCLING fact sheet

NORTHWEST BIOSOLIDS MANAGEMENT ASSOCIATION

ENVIRONMENTAL EFFECTS

Long-term scientific studies have consistently demonstrated that biosolids recycling is safe and beneficial when performed in accordance with federal regulations and guidance.

How Much Do We Know?

The management of biosolids to minimize environmental and health risks has been the focus of hundreds of university research studies conducted using biosolids from large and small municipalities on a wide range of soils generally at high application rates. Results from these studies show that the risk of adverse effects to the environment or public health from land application of biosolids is lower than from use of many conventional fertilizers and manures.

To ensure that biosolids are treated and appropriately managed, the United States Congress directed the U.S. Environmental Protection Agency (EPA) to develop comprehensive national standards to reduce the risks and maximize the benefits of land application of biosolids. In February of 1993, EPA issued its standards for biosolids management, 40 CFR Part 503, commonly referred to as the "503 Rule." This regulation addresses the following:

Metals

A small amount of metals such as cadmium, lead, copper and zinc can enter wastewater from industrial drains, from homes and from metal pipes. These metal pollutants remain in the solids throughout the treatment process. When biosolids are applied to the land, the metals cling to soil particles and organic matter and do not move down into the groundwater. Metals occur naturally in the soil and many metals are actually plant micronutrients. The amount of metals in biosolids is carefully regulated and monitored.

Table 3. A Comparison Between EPA Biosolids Pollutant Limits and Portland Biosolids -2003

Parameter	EPA Ceiling Limit (mg/kg)	EPA Pollutant Concentration Limit (mg/kg)	Land Applied Biosolids (mg/kg)
Arsenic	75	41	5.6
Cadmium	85	39	6.84
Copper	4,300	1,500	541
Lead	840	300	183
Mercury	57	17	2.41
Molybdenum	75	75[5]	14.5
Nickel	420	420	57.9
Selenium	100	100	6.4
Zinc	7,500	2,800	1,212

• *Government limits:* In order to protect human health and the environment, the EPA sets limits on the amount of trace metals allowed in biosolids. These levels are based on more than 20 years of research on how trace metals affect soils, plants and animals.

• *Pretreatment requirements:* Rigorous "pretreatment" programs control the amount of metals entering

wastewater treatment plants. Laws regulate industries to make sure that they dispose of their chemicals safely. This means that metals are removed from the waste stream before they ever reach the sewer. This ensures that biosolids contain metals only in small quantities.

• *Biosolids quality:* Biosolids are routinely tested for metal concentrations to make sure that they comply with all regulatory requirements. Biosolids in the Pacific Northwest typically meet the strictest requirements set by the Environmental Protection Agency.

Pathogens

Before treatment, wastewater may contain disease-causing microscopic organisms, such as bacteria and viruses, which are known as pathogens, or germs.

• *Federal law requires treatment to reduce pathogens:* Digesters and other forms of treatment kill at least 90 percent of the pathogens originally found in wastewater solids. Additional treatment by heating or composting is required to eliminate pathogens in biosolids used in home gardens and landscapes.

• *Land application completes the process:* Conditions such as exposure to sunlight, lack of moisture or a relatively harsh soil environment destroy the few remaining pathogens that may exist in biosolids soon after they are applied to the land.

• *Bioaerosol research:* Recent advances in technical methods have enabled scientists to look at the potential for pathogens in biosolids to be carried from application sites by wind. Scientists have confirmed that this does not occur, providing additional proof of the safety of land application practices.

Nitrogen

Biosolids contain organic and inorganic nitrogen and can be applied to plants as a fertilizer to dramatically accelerate growth. However, the addition of too much nitrogen, whether from biosolids or from a commercial fertilizer, can be detrimental to plant growth or can degrade groundwater or surface water.

Sites receiving biosolids applications are carefully selected and setbacks from streams and groundwater ensure the protection of water resources. Farmers and foresters consider plant needs and soil nutrient levels when applying biosolids to their crops and trees, providing only as much nitrogen as the plants can utilize.

Trace Synthetic Organics

Biosolids contain minute concentrations of certain regulated organic compounds including polycyclic aromatic hydrocarbons, phthalates and plasticizers, polychlorinated biphenyls (PCBs) and solvents. Organic compounds found in biosolids are present in such low concentrations (near the lowest detectable limits), that studies have found risks to be negligible. For this reason, the EPA did not include trace organics in the 503 Rule. Recently, people have asked about the concentration and fate of new classes of organic compounds in biosolids. These include flame retardants, personal care products and pharmaceuticals. Initial studies have shown that wastewater treatment breaks down most of these compounds. For example, over 90% of the estrogenic compounds entering a wastewater treatment plant were degraded in the standard treatment process. This research provides additional assurance that biosolids are safe for the soil.

Odor

Odor issues are a common concern associated with biosolids applications. The odor varies depending upon the treatment process used and ranges from a strong ammonia scent to an earthy, organic smell similar to that of freshly sterilized potting soil. Odor perception varies from person to person.