

Biosolids Recycling and The Metrogro Program

Biosolids Production

MMSD provides wastewater treatment to villages, towns and cities surrounding the Madison area lakes. Septage from homes throughout Dane County is also transported to the District's Nine Springs Wastewater Treatment Plant for additional treatment. Wastewater treatment relies on both physical and biological processes that produce two end products: biosolids and highly treated effluent.

Biosolids produced at the Nine Springs Plant are recycled to agricultural land as a fertilizer and soil conditioner through the District's Metrogro Program. Other biosolids handling options (e.g. incineration and landfilling) were initially evaluated by the District. However, the general public overwhelmingly supported recycling biosolids to agricultural land as a fertilizer and soil conditioner. The Metrogro Program has received national recognition and is used as a model by EPA. Farmer interest in the program is very high, with demand for the product exceeding the supply.

Regulation of Biosolids Recycling Programs

Biosolids recycling practices are regulated by both the USEPA and the Wisconsin Department of Natural Resources. These regulations are designed to ensure that biosolids recycling is conducted in a manner that is protective of human and animal health and environmental quality.

The USEPA has established comprehensive risk-based regulations for biosolids recycling programs. These regulations are commonly referred to as the Part 503 Regulations. The first step in EPA's regulation development process was to conduct a screening process to identify those parameters that might require a more detailed regulatory response. In the screening process, EPA assumed conditions that would maximize the potential for exposure.

Parameters that were not screened out during the first step were subject to a comprehensive risk assessment process. This process included several steps. First, potential environmental pathways were identified. A pathway simply describes how a human, plant or animal could potentially come in contact with trace elements contained in biosolids. Fourteen different pathways were identified.

The next step in the risk assessment process involved assembling all of the available scientific information that pertained to the pathway and parameter of interest. For example, information on plant accumulation of trace elements (e.g. copper, selenium and zinc) was collected. As a final step, maximum acceptable loading rates (e.g. pounds of the trace element per acre) were calculated, with the rates being low enough to ensure that human, plant and animal health are adequately protected.

The EPA regulations also contain some general site management requirements. For example, they specify that annual biosolids application rates may not exceed the nitrogen requirement of the crop grown. However, EPA recognized that individual states were

better positioned to address regional and/or site specific issues through their state regulatory programs.

The EPA regulatory approach is flexible in that new parameters can be added as new information becomes available. In fact, EPA is required to periodically review existing regulations and to determine if additional parameters require a regulatory response.

The Wisconsin Department of Natural Resources regulates biosolids applications under chapter NR 204 of the Wisconsin Administrative Code. NR 204 contains the same risk-based limits that were developed by EPA and contains some additional management and recordkeeping requirements. For example, NR 204 specifies setback distances from wells and homes. A hard copy of the entire rule can be obtained by writing WDNR. An electronic copy can be found at <http://www.legis.state.wi.us/rsb/code/nr/nr200.html>. Please contact Fred Hegeman at 608-267-7611 (email: frederick.hegeman@wisconsin.gov). of the Wisconsin Department of Natural Resources if you have specific questions regarding NR 204.

Site Inspection and Approval

All farms receiving Metrogro applications are subject to a formal site approval process administered by the Wisconsin Department of Natural Resources. As part of the approval process, environmentally sensitive areas that may exist on the farm are identified (e.g. soils with excessive slopes or soils subject to flooding or ponding). Metrogro may not be recycled in these areas.

Site Management

WDNR has specified standard setback distances from homes, wells and waterbodies as part of a standard set of management practices that must be followed. Metrogro may not be applied in these setback areas. Prior to recycling Metrogro at a site, all setback distances are marked out by placing orange flags in the field. In addition, environmentally sensitive areas are identified and marked using the flagging system. Although Metrogro can not be recycled in these areas, they are often worked up as a service to participating farmers. This is accomplished using the same equipment that is used to recycle Metrogro.

Metrogro Application

Metrogro is normally applied as a liquid (consisting of approximately 5% solids and 95% water) using specialized equipment that injects the biosolids approximately 8 to 10 inches beneath the soil surface. DNR regulations place a strong emphasis on nutrient management, particularly as it relates to nitrogen. Metrogro applications are based on meeting the nitrogen requirement of the crop grown. The nitrogen requirement is based on soil samples that are collected from each site on a routine basis and analyzed at the University of Wisconsin Soils and Plant Analysis Laboratory. Application rates are adjusted to account for other nitrogen sources that farmers may use on the same fields, such as manure or commercial fertilizer. These practices are designed to protect water quality. Typical Metrogro application rates range from 1.5 to 2.0 tons of dry solids per acre, which supplies approximately 140-160 pounds of available nitrogen per acre.

Metrogro is typically recycled to approximately 4,000-5,000 acres of farmland each year. Most of the farms participating in the Metrogro Program are located in Dane County, although a limited number are located in Rock, Jefferson Green and Columbia Counties.

Monitoring Programs

Metrogro samples are collected on a daily basis during the recycling season. These samples are then composited and analyzed on a routine basis for nutrients and trace elements. The Wisconsin Department of Natural Resources has established criterion for defined a "high quality" biosolids product on the basis of metal concentrations. Metrogro easily meets the WDNR definition of a high quality biosolids product.

The District also conducts a voluntary private well water monitoring program as part of the Metrogro Program. Wells in this program are sampled before Metrogro is initially applied to a site to document background conditions. These wells are then sampled on an annual basis. There are currently about 1,000 private wells that are part of the District's well water monitoring program.

It is not unusual for wells located in rural areas of South Central Wisconsin to have a high nitrate-nitrogen concentration on a background basis due primarily because of long term farming practices. A detailed statistical analysis of the District's well water monitoring information by the UW-Madison, Department of Civil and Environmental Engineering has demonstrated that there is no apparent correlation between nitrate-nitrogen concentrations and Metrogro applications.

Recordkeeping

Each field that receives Metrogro has been assigned a unique identification number by the Wisconsin Department of Natural Resources. All application information is tracked to this identification number, allowing for an accurate site history to be maintained at all times. The District maintains a very detailed database which contains information on biosolids quality, well water quality, site hauling/application history and metal loading information. Information on the site history for any farm participating in the Metrogro Program is available upon request.

Interaction With Other Agencies

The District works closely with outside agencies such as the Department of Natural Resources, EPA, Dane County Land Conservation Department, the Natural Resources Conservation Service and other groups to ensure that the Metrogro Program continues to operate in a safe and environmentally sound manner. The District also has an on-going relationship with the UW-Madison to conduct research necessary to address important issues relative to environmental quality.

Additional Information and Contacts

- Information on the EPA biosolids management program can be found on the internet www.epa.gov/owm/mtb/biosolids/htm.
- General questions regarding the Wisconsin Department of Natural Resources approach to regulating biosolids can be directed to Fred Hegeman at 608-267-7611 (email: frederick.hegeman@wisconsin.gov).
- Questions or concerns related to biosolids and health issues can be directed to John Hausbeck at the Public Health Department of Madison/Dane County. Mr. Hausbeck can be reached at (608)-243-0331 (email: jhausbeck@publichealthmdc.com).