

Biosolids Composting

Menasha Corporation



Case Study

Project History



This case study is one of four made possible through the Michigan Department of Environmental Quality's (DEQ) Pulp and Paper Pollution Prevention Program, or P5, a voluntary environmental initiative open to all pulp and paper companies in Michigan.

Program objectives were developed by a partnership between DEQ and the Michigan Pulp and Paper Environmental Council (MPPEC) to lessen the industry's environmental impact. Participants identify environmental substances of concern and establish priorities and goals for reduction of their use, generation, discharge, or emission. The technology transfer shared through the experiences of the participants is an integral part of this program. The four case studies are direct products of this technology transfer objective. Flyash recycling, wastewater aeration membranes, and business teamwork case studies have been written in addition to biosolids composting.

Company Background

Menasha Corporation is comprised of over 60 facilities that manufacture products and offer services ranging from corrugated containers, printed products, and food service items to consumer product labels, plastic components, and returnable material handling systems. Headquartered in Neenah, Wisconsin, Menasha celebrated its 150-year anniversary in 1999 and is one of the oldest privately held manufacturing companies in the United States.

The Paperboard Division of Menasha Corporation employs approximately 220 people full-time. The pulp and board mill produces 800 tons of corrugated medium (paperboard) daily, which is used to make corrugated containers (boxes) both internally at Menasha's packaging plants as well as state converters.

Corrugated paperboard is produced from renewable resources ranging from a balanced combination of virgin wood fiber and recycled corrugated containers to 100 percent recycled content. The Paperboard Division's Forest Management Program also is committed to the stewardship of southwestern Michigan forests and the Michigan Sustainable Forestry Initiative. Menasha's foresters can assist forest landowners with making informed decisions to improve their woodlots.

Composting Process

In papermaking, water is used to dilute pulp to a fine slurry of wood fiber. This slurry is then pressed and dried into paper. Along the way, many materials get picked up by the large amounts of water passing through the mill. Also, organics from the pulp are extracted and diluted with the water. This process water must be treated to remove these substances before being returned to its source and reused.

Usually, the first stage in the treatment of wastewater is to remove as much of the solid matter present as possible. In the case of a paper mill, these solids are mostly composed of organic materials: cellulose, hemicellulose, and lignin from the wood. The rest of the solids composition can be ash and nutrients like

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nitrogen and phosphorus or inorganic particles such as clay, calcium carbonate, and titanium dioxide. Some residue of bacteria used for secondary (biological) treatment may also be present. The solids are commonly referred to as “sludge”; specifically, the solids from secondary treatment are sometimes termed “biosolids.”

The sludge can contain materials that promote plant growth and have a natural resistance to disease. Instead of landfilling this waste product, Menasha Corporation of Otsego seeks useful alternatives. Because Menasha manufactures corrugated medium, the amount of inorganic substances in its sludge is lower than that of mills producing coated or printing paper.

Since 1974, Menasha has land-applied biosolids in slurry form to local farmland. As the mill began to expand and increase production, the amount of sludge produced also increased. Screens and filters do reduce the amount of fiber lost in the process, but the mill has still had to hunt for more farmland acreage. At the same time, some of the farm sites used in the past were being developed into residential areas. The mill was forced to look for available farmland further and further from the mill. This added distance increased the cost of delivery and lessened the frequency and amounts being applied. The mill began to look to alternative methods of using the biosolids.

Menasha began dewatering the sludge with belt filter presses, making for a more versatile and easily transportable product. The mill considered composting the dewatered sludge. With a composting company, it discussed the feasibility of creating a product from the waste and wood fines from the mill’s chipping area. Following a series of trials of making compost and topsoil materials in 1995, the company started to manufacture the products at a location on the mill site that same year. Menasha formed a partnership with Renewed Earth, a supplier of topsoil and container mixes for the landscape and nursery industry.

Renewed Earth manages the research, manufacture and marketing of the compost project. Menasha has benefited economically through land application cost savings and the added income from the sold product. Renewed Earth sells the high quality compost products in the greater Kalamazoo, Battle Creek, and Grand Rapids areas of Michigan.

Menasha's objective is to use 100 percent of the biosolids produced at the mill for the composting project and similar beneficial uses. Currently, the mill produces 11,000-12,000 dry tons of biosolids per year. Menasha still continues to land-apply the sludge not used for composting.

In 1996, the partnership produced 35,000 cubic yards of container mix compost. This mix is suited for nurseries that grow potted perennials and bushes.

In addition, 10,000 cubic yards of topsoil material were also produced. This material received approval to be used by the Michigan Department of Transportation for highway construction and improvement projects. The users of the products have been very pleased with the quality: the material is lighter than soil, making for easier application; it does not clump when wet; it is practically weed-free; and it promotes plant growth due to the presence of the organic substances.

The compost is not entirely made up of biosolids—different mixes may contain composted leaves, hardwood bark, pine bark, and long grain rice hulls. Temperatures, moisture measurements, pile turning, and test results are all recorded and entered into a computer.

Menasha has encountered a few barriers in developing this project. For one, compost takes time to make: the pile of organic material has to heat up and stay at certain temperatures in order to degrade into a useful product. While this process is taking place, the huge piles of compost are taking up space. The Menasha mill has limited land available for the composting project.

Another problem is finding customers—because the composted soil product is relatively new, landscaping and nursery companies may be skeptical at first. This problem is decreasing as the product proves its worth.

The market area is also a concern. The costs of shipping are high; therefore, selling to the local area is the only way to remain competitive. However, sales are projected to increase dramatically within the next coming years.

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