



- Michigan State Natural Resources Conservation Service
- Michigan Department of Agriculture
- Michigan State University – Department of Biosystems and Agricultural Engineering
- Michigan State University – Department of Crop and Soil Sciences
- Michigan State University Extension
- Michigan Milk Producers Association
- Clinton County Soil and Water Conservation District
- Gratiot County Natural Resources Conservation Service
- Foster Trenching
- Ensz Dairy

Currently under Michigan DEQ regulations, the only option that producers have is to pump their milking center wastewater off to a manure storage structure for later land application. At a volume of 1,000 gallons per day, 365 days a year, that requires a storage volume of 365,000 gallons. When it comes to land application time, this converts into about 50 7,500 tanker loads of wastewater that must be applied to the land for disposal. Besides the potential for runoff and environmental impact of the land applied wastewater there is the cost in the storage structure, machinery, fuel and time for land application. This project involves a full scale system on a dairy farm testing a number of biological (shredded bark and wood chips) and non-biological (recycled Styrofoam pellets) filters to act as a filter mound prior to discharge into a soil based treatment system. Disposing of milking center wastewater via a normal soil treatment system (septic leach field) has been tried in the past and generally fails in a short time due to biological clogging caused by the high strength of the waste water. In this project we are working to avoid that by providing some primary treatment from the filter mound. This project grew out of a student senior design project where BE students performed an experiment by dosing milking center wastewater through a four foot column of landscape woodchips. The students found that they were able to reduce the strength of the wastewater by 70% percent and removed the offensive odor. In this new study, we are building a full scale system to treat 1,000 gallons per day of milking center wastewater. The treatment system itself merges the technologies of biological filtering and small-scale wastewater treatment.

The system is conceptually simple in design. First, the milking center wastewater is drained through a series of 3 1,500 gallon septic tanks. The primary goal of so many septic tanks is to promote a long residence time to remove as many of the wastewater solids, fats, greases, and oils by settling or forming a floating scum layer. By removing as much as possible prior to discharge to the filter mound will decrease the chances of clogging within the filter mound and soil. Next, the wastewater is drained into a pump chamber where it will be pressure dosed out into the filter mound by a screened pump. Through the filter mound, four perforated distribution lines will pulse the wastewater into the mound on a timed basis where it will trickle through the media. The media will act as a site for bacteria to attach and grow where it can feed on the contaminants in the wastewater. After passing through the woodchip/bark media, the wastewater will

infiltrate into the ground where it will receive further treatment. Figure 1 shows one of the treatments we will be evaluating in this project.

The filter mound will be built in a small pasture down slope from the milking parlor on the farm. Since this treatment system is going to be full scale and treat around 1,000 gallons per day, it will be taking up a lot of space. The treatment system will be approximately 200 feet long by 18 feet wide. We will be breaking the system up into 4 – 50 foot sections to test different media types and options. These include wood chips, shredded bark, shredded bark with passive aeration, and recycled Styrofoam chips. The evaluated the effectiveness of the system, we will be sampling the wastewater at a number of locations within the treatment process.

