

Food Residuals in Dane County

Environmental Impact at Landfill

Leachate:

Leachate is the contaminated liquid that percolates through the waste in a landfill. It is collected by the landfill liner and is sent to MMSD for treatment. At present, the Rodefild Landfill produces about 15,000 gallons per day. Liquid wastes are not allowed at the landfill and consequently most of the liquid that is collected enters the landfill as precipitation.

Based on waste composition studies, 15-20% of the waste being landfilled is food waste. Removal of this portion of the waste stream from the landfill would not have a significant effect on the volume of leachate produced, but it would reduce the strength of the leachate. In particular, the Biological Oxygen Demand and the nitrogen concentrations would be reduced making the leachate easier and less costly to treat. These particular types of contaminants are not a major threat to groundwater quality at a modern landfill. A similar threat to either surface water or groundwater quality would also be present at a large centralized compost facility and that is the reason why the DNR limits food residual compost sites to 500 cubic yards or less without implementing engineered site modifications to ensure that the environment is adequately protected.

Odor:

Odors are controlled at the landfill by both an active gas extraction system consisting of gas wells, collection pipes and blowers, as well as the use of daily cover to help prevent the escape of gas. Two fairly distinct types of odors exist at landfills. The first type of odor is that of landfill gas that is produced through the anaerobic breakdown of organic waste consists of roughly 50% methane and 50% carbon dioxide with trace quantities of other gases. It is the trace gases including such things as hydrogen sulfide that produce the odor. Because the removal of food wastes would not eliminate all organics from the landfill, landfill gases would still be produced and would need to be captured and treated. It would however reduce the quantity of landfill gas being produced thereby reducing odors to some extent. The second type of odor is the sour, "garbage" odor such as one smells around a dirty garbage can after a series of hot summer days. Most of this type of odor found in a landfill setting is likely due to food wastes and would probably be significantly reduced if all food residuals were kept out of the landfill.

Methane Generation:

Methane gas is a non-toxic but explosive gas that is produced during the anaerobic decomposition of organic wastes. At landfills, this gas must be collected by means of a gas extraction system and destroyed by combustion. At the Dane County landfill the methane that is burned is converted into electricity and sold into the power grid. This combustion process also destroys the small quantities of trace gases that may be present in landfill gas many of which are toxic or carcinogenic. Monitoring of gases at the landfill is required to ensure that only limited amounts of the total gas produced is escaping into the environment.

Using gas production assumptions from the literature, the Dane County Waste Composition Study, methane collection data from the Rodefild Landfill, and an estimated landfill gas

collection efficiency range of 50-75%; the diversion of food residuals from the landfill would result in the production of 5-10 % less methane. Because a large quantity of organic material would still be in the landfill even if all food residuals were kept out, a gas extraction and combustion system would still be necessary. Because of the heterogeneous nature of the wastes in a landfill and the unpredictable nature of the flow paths that gas takes while moving through a landfill, even with a substantial reduction in the total amount of methane produced some of the landfill gas will still manage to escape into the atmosphere where it is a problem due to its greenhouse gas effect. It should be noted that the breakdown of organic matter at a compost facility is an aerobic process and as such does not produce any methane. Therefore gas control systems are usually not needed at most small compost sites and where they are present at larger sites it is for odor control rather than methane control.