Tons of waste being kept out of landfill thanks to MORC

City of Muscatine | August 5, 2020

MUSCATINE, Iowa – The Muscatine Organic Recycling Center (MORC) has been in operation at the Muscatine Transfer Station since December 2019, and is making an impact on the reduction of organic waste being sent to area landfills including the Muscatine County Landfill.

“We have learned a lot in the last six months,” Jon Koch, Water and Resource Recovery Facility (WRRF) Director, said. “And business continues to grow.”

Koch was instrumental in the development of the Muscatine Area Resource Recovery for Vehicles and Energy (MARRVE) program that led to the establishment of MORC. The primary goal of MARRVE is to receive organic waste and convert that waste into renewable natural gas that can be used by Compressed Natural Gas (CNG) vehicles.

“This fuel is the only carbon negative footprint vehicle fuel that removes more carbon from the environment than it puts out when burned in an engine,” Koch said.

Reduction of organic waste in landfills is another benefit of programs like MARRVE. “Organic waste makes up 18-to-22 percent of landfill material,” Koch said. “That waste could be diverted and converted into a usable product through composting or anaerobic digestion.”

The construction of the High Strength Waste station (the old recycling center at the Muscatine Transfer Station) that receives fats, oils, and greases from commercial kitchens, was the first step in the creation of a usable product. The second was the development of the organic waste receiving station that processes organic waste into a product that can be fed to the anaerobic digesters.

“We are processing 25 to 30 tons of organic food waste each day,” Koch said. “Our target is 50 tons per day. Other phases of this process have to be completed before we can fully realize the potential of this program.”

Food products and food in containers that are not suitable for sale due to health concerns or due to food quality standards mot being met need to be destroyed but regularly end up in landfills. These products that are not fit for human or animal consumption can be used to feed the anaerobic digesters located at the WRRF facility.

Anaerobic digestion is a process though which bacteria break down organic matter without oxygen according to the Environmental Protection Agency (EPA). As the bacteria “work,” they generate biogas that is mostly methane, the primary component of natural gas. This gas is then collected and will eventually be processed into compressed natural gas that can be used to fuel vehicles.

Codigestion occurs when anaerobic digestion is used to break down multiple forms of organic waste in one anaerobic digester. Organic wastes that can be used in codigestion include restaurant or cafeteria food wastes; food processing wastes or byproducts; fats, oil and grease from restaurant grease traps; energy crops; and crop residues. Codigestion can increase biogas production from low-yielding or difficult-to-digest organic waste.

“The bacteria in our digesters love the organic waste product we are feeding them,” Koch said. “We are producing a lot more methane gas that is currently being burnt off. Eventually we will have the facilities in place to turn that methane gas into compressed natural gas.”

The digesters not only produce biogas but also solid and liquid components such as fertilizer that can be used in place of commercial fertilizers by area farmers.

Several companies have already signed on to bring their food waste to MORC where it is sent through the T42 Turbo Separator, a depackaging machine that separates the food waste from their containers. The organic food waste is pumped into a tanker truck to be taken to the WRRF while the containers are taken to the Transfer Station tipping floor where they are eventually hauled to the landfill.

“The T42 is specially designed to take packaged waste and separate the packaging from the food inside,” Koch said. “It does this will paddles that break open the package and spinning the food out. The packaging will come out the end and the spinning food waste will drip through the bottom. When the food falls out it is then pumped to tankers that will deliver the material to the WRRF.”

Not all of the packing material ends up in the landfill. “Some of that container material is actually taken to Buffalo where it is incinerated, further reducing what is taken to the landfill,” Koch said.

Nestle Purina of Davenport is just one of the companies bringing food waste to MORC.

“They have an aggressive zero waste program that fits in well with our operation,” Koch said.

Zero Waste is an ambitious program with a goal of diverting 90-100 percent of waste from landfills and incinerators by 2040. The Zero Waste International Alliance defines the program as the conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health.

Green RU has also signed on to deliver organic waste to MORC. Green RU operates an organics hauling business that takes mixed organic waste from multiple generators including grocery stores, businesses and food production industries.

The Future of the High Strength Waste Project

Phase I of the HSW Project constructed the facilities to receive high strength waste such as fats, oils, and grease from restaurant grease interceptors. Solid food waste from grocery stores, cafeterias, restaurants, industries, and residents was added once the depackaging machine was installed at MORC.

Processed food waste is transported from MORC by city tanker trucks to the WRRF where it is added to existing anaerobic digesters used for municipal waste treatment. Koch estimates that the capacity of the existing digesters will be exceeded with the current contracts for receiving food waste and additional interest from facilities in eastern Iowa and western Illinois.

The Digester Rehabilitation Project, included in Phase II of the HSW Project, will install a new digester system in an old digester complex with the ability to expand. The rehabilitated system will allow the WRRF to receive larger amounts of material and will generate significant revenue for the City.

The City, through the WRRF, has applied to the EPA for a $300,000 Supporting Anaerobic Digestion in Communities (SADIC) grant to help pay for the $715,000 rehabilitation project.