2013 WATER SUCCESS STORY

Bureau of Water Quality

Private sector/public sector partnership produces energy and clean water

By: U.S. Environmental Protection Agency and DNR staff

On January 24, 2013, U.S. Environmental Protection Agency (EPA) and DNR state revolving fund representatives visited the City of Beaver Dam wastewater treatment plant to view plant upgrades funded through the Clean Water State Revolving Fund (CWSRF) program. The overall cost of this unique project is approximately $20 million, with half of the funding coming from the American Recovery and Reinvestment Act (ARRA) and the other half a low interest CWSRF loan.

The Beaver Dam project is different because it involved a public/private partnership between the City of Beaver Dam and a Kraft Foods plant that produces a high-strength whey waste.

The project is also unique in that it's categorized as a "green project" because the high-strength whey waste is used to produce biogas and generate electrical energy. The construction of the project is complete, and representatives from the EPA and DNR viewed the operation of the new biogas energy generation portion of the wastewater treatment plant.

These 400 kw units generate power from methane gas, which is then sold to the electric utility. Photo by DNR Wastewater Engineer Bernie Robertson.

The Beaver Dam project receives the high-strength whey waste from the Kraft Foods plant via a dedicated 4,000-foot pipeline. The high-strength whey waste goes to an anaerobic digester that produces the biogas, which in turn is sent to two 400 kilowatt combined heat and power (CHP) engine generators. The micro-organism population in the anaerobic digester continues to grow, currently producing enough biogas to run one generator continuously for almost an entire year. The amount of Kraft's whey waste fluctuates throughout the year. As the amount of micro-organisms increases in the digester, so will the amount of biogas produced.

A bird's eye view of the Beaver Dam wastewater treatment plant looking at the aeration basins, where a mixture of naturally-occurring microbes consumes dissolved pollutants. Photo by DNR Wastewater Engineer Bernie Robertson.

The Beaver Dam wastewater treatment plant has an agreement with Alliant Energy to sell its biogas-produced electricity for nine cents per kilowatt-hour, whereas the wastewater treatment plant buys its electricity at six cents per kilowatt-hour. Based on current biogas production, the wastewater plant breaks even on its electrical costs. The plant will make more on the sale of electricity once biogas production increases.

This project is an excellent example of several positive attributes: community cooperation with a private entity; advanced planning to harness a green energy source; and the ability to use the CWSRF program (via ARRA funding) to the maximum advantage for the community. Kraft Foods also was able to find a use for its whey waste, avoiding the practice of applying the waste to farm fields, which previously had denigrated water quality.