

Davenport, Iowa
Water Pollution Control Plant
ENERGY COST TO ENERGY CREDIT

FOX Engineering Associates, Inc. is proud to observe the ten-year anniversary of a vision for process improvements at the Davenport wastewater plant that not only reduced costs for the citizens of the community but were also a significant improvement to the environment.

The Davenport Water Pollution Control Plant has made a very impressive, almost miraculous, reduction in energy consumption and energy cost over the life of their treatment plant. The plant was constructed in the 1970's and included conventional preliminary, primary, and secondary activated sludge processes for that time. The solids handling processes were also 'state of the art' at that time but very heavy in energy consumption and light in the return of resources to the environment. Solids handling included vacuum filters for biosolids dewatering, a ZIMPRO solids conditioning system and incineration. These processes generated significant odors, especially the ZIMPRO process, and utility bills for the plant totaled over \$1,000,000 a year.

Environmentally Sound and Energy Efficient

In the 1980's plant manager Jim Resnick convinced the City that anaerobic digestion of biosolids was a more environmentally sound and energy efficient method of processing waste sludge. Two anaerobic digesters were constructed and use of the incinerator was discontinued. Primary solids were dewatered directly on the vacuum filters for landfill disposal while waste activated sludge was digested prior to dewatering and landfilling. These changes reduced the energy cost to about \$750,000 per year.

Additional Digestors and Generators Further Reduce Energy Costs

In the early 1990's, Mr. Resnick, Dennis Ryan (current plant manager) and FOX Engineering developed and implemented a plan to replace the vacuum filters with belt presses and construct two additional anaerobic digesters so all biosolids produced could be digested. The digester project included the addition of two 600 kw electrical generators that burned the methane gas produced in anaerobic digestion. The power produced offset the power that had to be purchased to reduce energy cost.

Additional Reduction in Costs

In the midst of this project the Iowa legislature passed a bill requiring utilities to have a small percentage of their total energy production from 'alternate energy sources' and mandated that the utility pay for the alternative energy at a rate of six cents per kilowatt. Davenport negotiated a long-term contract with Mid-American Energy to take advantage of this opportunity. The net result of the new digester and generator project plus the alternate energy contract was a further reduction in energy cost of about 50% to about \$350,000 per year.

Compost Operation

At the same time as the digester expansion and generator project were underway, the City of Davenport also modified the biosolids disposal process to a compost operation. Final disposal for the anaerobically digested and belt-press dewatered sludge was a compost facility. The compost operation has been another environmentally successful project that continues to provide for reuse of the valuable resources in the waste organic material.

Improvements Spell Income

In the early 2000's, Dennis Ryan developed a project to modernize and improve the secondary treatment process. The coarse bubble diffusers and mixers were replaced with fine bubble diffusers and the process changed to contact stabilization. The activated sludge process is far more efficient and not only reduces energy requirements further but also increases treatment capacity. The reduction in energy requirements of the aeration system meant the plant can now produce more energy than it uses most of the time. A switching system was added to the electrical service to allow export of power to the utility when excess power is generated. **The net result of this further improvement is that now, on the average, the WPCP has a net income from power sales (\$36,000 for the first five months of 2005) instead of a \$1,000,000 annual expense as it did when it was new thirty years ago.**

Mr. Resnick, Mr Ryan, the City of Davenport and FOX Engineering (the consultant on the generator project) had a vision for process improvements at the Davenport wastewater plant that not only reduced costs for the citizens of the community but were also a significant improvement to the environment.