LAWPCA Anaerobic Digestion Project

As part of its long range planning efforts, the Lewiston Auburn Water Pollution Control Authority identified anaerobic digestion as a promising technology to enhance its biosolids utilization programs, to eliminate the need for landfill disposal of a portion of the treatment plant solids, to add overall facility capacity and to provide a source of renewable energy to the treatment plant while improving the "carbon footprint" of the treatment works.

The project became a point of discussion in the later part of 2008. January 2009 the LAWPCA board of directors approved a feasibility study to be conducted by Camp, Dresser and McKee of Cambridge, Massachusetts. Conceptual Design through Preliminary Design was completed between January 2009 and January 2010. The board of directors chose to hire Arcadis, an international firm, during the spring of 2010 to conduct a value engineering study on the project preliminary design. The study found significant savings that were then incorporated in to the design of the project. During August of 2010 the project was presented to both the Lewiston and Auburn City councils. The project received support from both city councils and in October 2010 the LAWPCA board of directors approved the final design of the project. Final design was completed in June of 2011 and the project was advertised for bidding later that month. Bids were opened on July 27th with the lowest bid and award going to Methuen Construction of Salem, NH for a total base bid of $11,957,548. The LAWPCA board of directors approved the Project at the August 12, 2011 board meeting and construction contract documents were signed on September 1, 2011.

The project offers the Authority many operational benefits and cost savings. In addition, if the Authority chooses to there will likely be capacity to accept high BTU wastes that could significantly increase gas production without a concomitant increase in solids generation. Some of the most assured and salient benefits are listed below:

- A reduction of solids needing utilization or disposal of approximately 40%. This solid reduction will, in turn, lead to annual cost savings of approximately $600,000.
- Eliminate the need to add lime to accomplish class B pathogen and vector attraction reduction for the portion of the Authority's biosolids that are land applied.
- Eliminate the need for transportation and tipping fees associated with managing that portion of the Authority's Biosolids production that exceeds capacity of the compost facility or land application program. Currently this is approximately 12% of the Authority's annual solids or 3,000 to 4,000 cubic yards.
- Provide operational flexibility and capacity to the treatment plant by providing a means to temporarily store waste solids when needed (such as due to wet field conditions affecting the land application program).

- Generate electricity and heat on site. The digesters, without supplemental materials from outside sources, are expected to provide approximately two thirds of the electricity currently used by the treatment plant.
- Reduces solids odors and volume, thereby making both the land application program and the compost facility operations more acceptable to residents abutting these sites.
- The project adds flexibility and capacity to the overall biosolids utilization and disposal infrastructure for the State of Maine by removing the volume of biosolids currently sent to landfills or private processing facilities.
- By removing approximately 2/3 of the power currently used by the largest electricity consumer in municipal operations in the Twin Cities, a significant renewable power source is added to the overall electric power grid while substantially reducing peak demand on the system.

- Approximately 15% of the total capacity of the digesters is expected to be available to accept off site wastes that have been difficult to dispose of such as sewage contaminated oils and grease, thereby enhancing Maine's waste treatment infrastructure.

The major components of the project consist of two 65 ft diameter, 25 ft sidewall depth mesophilic digesters, a 50 ft diameter, 12 ft sidewall depth digested sludge holding tank with a flexible membrane gas holding having a capacity of 30,000 cubic feet, two 230 KW reciprocating engine generator sets, and a standby gas flare. A number of pumps, heat exchangers, gas cleaning equipment systems and other appurtenances will also be needed. The purpose of the project is to increase overall solids handling and utilization capacity of the treatment facilities while reducing overall operating costs. No increase in the volume of wastewater accepted or treated is expected as a result of this project. Ancillary benefits include increasing the sustainability of the Authority's land application (Class B biosolids) program by eliminating the use of lime for stabilization and reducing biosolids odors and producing a significant amount of the energy currently used at the treatment plant.

The project is exciting and went online in May of 2013 with the startup of the #1 digester. Feed material was brought in from the Nashua, New Hampshire WWTP and an approximate 30-day feed schedule of LAWPCA material was used to slowly ramp up material in to the digester. Once the #1 digester was up and running, the #2 digester went online and was seeded from the digested material in the #1 digester. Both digesters were online and fully operational by the middle of June and producing an average total gas volume of 75 CFM. The gas was utilized in the boilers for heating the digester sludge and also flared until the cogeneration engines were online and synched with Central Maine Power. Then entire system in fully functional and performing as designed.

If interested in learning more about the anaerobic digestion process, or touring the facilities please contact Travis Peaslee, LAWPCA Assistant Superintendent, at (207) 782-0917 or tpeaslee@lawpca.org .