CENTRE FOR WATER RESOURCES MANAGEMENT

McGill

Dr. Stefan Grimberg

Department of Civil and Environmental Engineering
Clarkson University at Potsdam, NY

Anaerobic Digestion of Sand-Laden Dairy Manure

Odor reduction has been the primary motivation for farms to install anaerobic digesters treating animal manure. However, high capital costs and a history of unreliable operation have not resulted in a widespread adoption of this waste treatment technology. Of the digesters built in the mid 70's less than 50% are still in operation. Higher energy costs and the government's recent interest in renewable energy have renewed the interest of the farming community in farm digesters. In order to avoid mistakes made in the mid 70's there is a need to develop fundamental engineering tools that allow for design of cost efficient and reliable digesters. The goal of our research project is to develop a systems model of a farm digester–combined-heat-and-power system allowing for the optimization of the system given farm specific operation, location and socio-economic constraints. The presentation will focus on the development and validation of the digester model, which is currently being incorporated in the overall optimization model. Laboratory data and results from a pilot study will be presented and compared with model predictions of the adapted Anaerobic Digestion Model No. 1 (ADM1). The second part of the talk will focus on sand separation of sand laden manure within the digester. Sand, the bedding of choice for many dairy farms due to the increased cow comfort, causes a major challenge for waste treatment. Traditional approaches require sand/manure separation before digestion which will results in manure dilution, thus in an inefficient biological process. Sand separation within the digester has the potential of increased reactor efficiency and pathogen reduction on the sand thereby allowing the sand to be reused on site. Results from our laboratory investigation will be presented.

Professor Stefan Grimberg has been teaching and conducting research in the Department of Civil and Environmental Engineering at Clarkson University since 1996. Recent research projects include studying the transport of colloidal material and microbes in porous media and the effect of redox conditions on the fate of mercury in wetland soils. Most recently Dr. Grimberg has been leading a multidisciplinary research project to study the conversion of dairy waste to biogas via anaerobic digestion. He received a M.S. in 1989 and his Ph.D. in 1995 both in environmental engineering from the University of North Carolina at Chapel Hill.

Friday, March 7th, 2008
McGill Macdonald Campus, Raymond Building, Room R3-011
10:00 am - 11:00 am

EVERYONE WELCOME