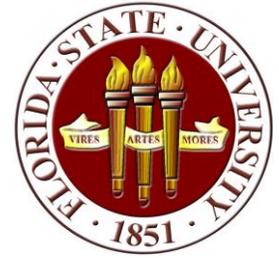




FAMU – FSU COLLEGE OF ENGINEERING
DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING
2525 Pottsdamer Street
Tallahassee, Florida



Tag Meeting No. 2
Friday, September 12, 2014
11:30 am – 1:30 pm, Room Building A 127A

Minutes

Project Title: Aerated Recirculation and Pressurized Suspended Fiber Biofiltration for the Treatment of Landfill Leachate

Tag Members: Tarek Abichou, Peter Grasel, Gary Millington, John Hallas, Brian Lee Moody and Hafiz Ahmad

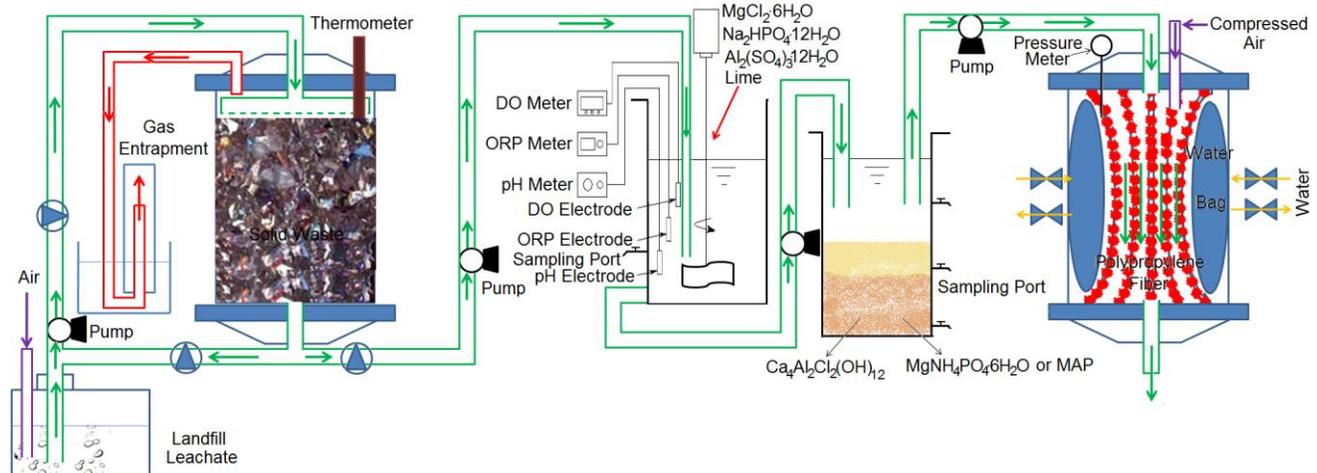
In Attendance: Peter Grasel, Gary Millington, John Hallas, Brian Lee Moody, Hafiz Ahmad, Tim Vinson, Gang Chen, Boya Wang and Sam Levin (through Gotomeeting)

Principle Investigators: Gang Chen and Kamal Tawfiq

A website has been developed for this research (www.eng.fsu.edu/~gchen). All the information regarding this project has been uploaded to this site to facilitate the dissemination of the research discovery.

1. Project Overview and Experimental Setup

Detailed information is available at <http://www.eng.fsu.edu/~gchen>



2. COD and Iron Removal as a Function of Recirculation Cycle and Recirculation Ratio

Landfill leachate collected from the Leon County Landfill was aerated before being re-circulated to the recirculation reactor, after which an aliquot was introduced to the next treatment step and the other aliquot was aerated and re-circulated. The re-circulated leachate was aerated at an air

flow rate of 0.2 L/min, 0.5 L/min, 1 L/min and 5 L/min for 15 min before being re-circulated to the reactor. After around 4 recirculation cycles, the effluent leachate quality became stable, i.e., no further COD and iron reduction was noticeable. At this stage, recirculation ratio was further studied. Specifically, recirculation ratio of 100%, 75%, 50%, 25% and 0% (with corresponding 0%, 25%, 50%, 75% and 100% added fresh leachate) was examined.

3. Chloride Removal

After recirculation, the aliquot introduced to the precipitation reaction tank was tested for chloride removal. For chloride to precipitate as $\text{Ca}_4\text{Al}_2\text{Cl}_2(\text{OH})_{12}$, $\text{Al}_2(\text{SO}_4)_3 \cdot 12\text{H}_2\text{O}$ at a concentration of 100 mg/l was added and the pH was adjusted with lime.

4. Pressurized Suspended Fiber Biofiltration Performance Evaluation

Iron removal and organic decomposition are examined in the pressurized suspended fiber biofilter. At the end of the experiments, the fiber was taken out and observed under a scanning electron microscope.

5. Dissemination Plan for this Project

6. Potential Funding Sources for the Continuation of Related Research

— NSF/CBET/Environmental Engineering

7. Discussion

Following are the issues raised in this TAG meeting:

- a. The input concentration of leachate
Currently, the leachate treated in the system was freshly collected leachate from Leon County landfill with four or five times of dilution. Peter, Gary and Tim suggested testing the system with an incremental increase of the leachate concentration. It is preferred that the system can handle a high leachate concentration with stable treatment results.
- b. Air flow rate in the recirculation reactor
Organic removal and iron removal are a function of air flow rate and recirculation ratio in the recirculation reactor. Since the cost of air flow is much lower, Tim suggested taking consideration of increased air flow rate and decreased recirculation ratio to reduce the operation cost. For the pressurized biofiltration process, similar consideration was recommended.
- c. Water bags in the pressurized biofilter
Tim suggested compressed air instead of water to be used in the water bags in the biofilter for the compression of the suspended fiber.
- d. MAP precipitation and ultra-high lime with aluminum process
There are several suggestions coming from the discussion of the physicochemical precipitation process regarding ammonium and chloride removal. John, Peter and Gary all commented on the competition of MAP with other cation precipitation processes such as calcium precipitation. John suggested a pH lower than 9 for a purer MAP precipitation.

Tim suggested the usage of $\text{Mg}(\text{OH})_2$ instead of MgCl_2 to avoid the introduction of extra Chloride.

- e. Research at FSU Panama City campus was also discussed between Tim and Hafiz.
- f. Sam Levin suggested testing of the leachate from the Jackson County landfill.