



# FAMU-FSU Engineering

## FAMU - FSU COLLEGE OF ENGINEERING DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

### Technical Awareness Group (TAG) Meeting No. 2 Monday, August 12, 2019 11:45 am – 12:45 pm EDT Building A Room A305 2525 Pottsdamer Street Tallahassee, Florida

**Project Title:** Using Nitrate Produced from Leachate to Control Landfill Odors

**TAG Members:** Wester Henderson (Hinkley Center for Solid and Hazardous Waste Management), John Schert (Hinkley Center for Solid and Hazardous Waste Management), Ashvini Chauhan (Florida A&M University), Chao Zhou (Geosyntec consultants), Dean Chaaban (City of Tallahassee), Edward A. Bettinger (Florida Department of Health), Joseph B. Cheatham (City of Tallahassee), Joseph Dertien (Florida Department of Environmental Protection), Owete S. Owete (Florida Department of Environmental Protection), Robert J. Wandell (Advanced Fertilizer Systems, LLC), Shanin Speas-Frost (Florida Department of Environmental Protection), Dawn Templin (Florida Department of Environmental Protection), Liang Li (Florida Department of Environmental Protection), Roger Green (Waste Management)

**Principle Investigators:** Youneng Tang and Tarek Abichou

#### **Project Overview**

The meeting was called to order by Dr. Tang at 11:45 am. Dr. Tang firstly presented the project overview, which mainly included a problem statement and a proposed solution. The frequent news reports of landfill odors after hurricanes suggest the need of odor control. Odors are mainly caused by the generation of hydrogen sulfide gas, which is due to the accumulation and degradation of drywall in the landfills. Nitrate generation from landfill leachate was proposed as an inexpensive and sustainable way to suppress the production of hydrogen sulfide in landfills. Dr. Tang then discussed the experimental results, which showed successful suppression of hydrogen sulfide generation and the feasibility of proposed method. Detailed project information is available at <https://ww2.eng.famu.fsu.edu/~ytang/project9.html>



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## **Project Tasks and Team**

Dr. Tang presented three tasks including: 1) lab-scale landfills setup and hydrogen sulfide monitoring (completed), 2) biological transformation of ammonium to nitrate (completed), 3) suppression of hydrogen sulfide generation by applying nitrate to the lab-scale landfills (partially completed).

The research team mainly consists of Dr. Youneng Tang (PI), Dr. Tarek Abichou (co-PI), Zhiming Zhang (graduate student), and Karam Eeso (undergraduate student).

## **Project Status**

Tasks 1 and 2 have been completed. Task 3 is expected to be completed by the end of 2019.

## **Group Discussion**

Major comments and suggestions from the TAG:

- Mass balance analysis on sulfur species is suggested. On one side of the mass balance equation is the total  $\text{CaSO}_4$  (from drywall) put into the lab-scale landfills. On the other side of the equation are hydrogen sulfide in the gas and leachate, sulfate in the leachate and so on. The mass balance equation may be used to estimate the duration of landfill order production and the dose of nitrate.
- Drywall could be dumped into the landfills together with other nitrate-containing waste or products, which is another approach to suppressing hydrogen sulfide at the source. To test if this approach is practical, two lab-scale landfills could be set up in future research, including a landfill filled with mixed drywall and nitrate-containing waste/products and a control landfill without the nitrate-containing waste/products.
- The nitrate dose of nitrate: sulfate = 1:1 has been tested. To evaluate the effects of other nitrate doses, Dr. Tang plans to request no-cost time extension of the project until Dec. 15 2019.
- The team has been reaching out to landfill managers. The team will continue to do this and hope that some landfill managers are interested in pilot-testing this method.

The meeting was adjourned at 12:45 pm, minutes taken and submitted by Zhiming Zhang.