FAMU-FSU Engineering

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

Technical Awareness Group (TAG) Meeting No. 1

Tuesday, January 09, 2024, 2:00 – 3:15 pm Eastern Time
Meeting location: Zoom

Project Title #1: Fate and Transport of PFASs in the Landfill – Impact of the Perfluoroalkyl Chain Length

Project Title #2: Fate and Transport of Volatile PFAS in Bench-Scale Municipal Solid Waste Landfills

TAG Members: Bruce Marvin (Geosyntec Consultants), Chao Zhou (Geosyntec Consultants), Kevin Warner (Geosyntec Consultants), Gary Williams (Florida Rural Water Association), Paul E. Seaver (Palm Beach Springs Water Company Inc.), Sterling Carroll (Florida Rural Water Association), Owete S. Owete (WSP USA), Natalia Soares Quinete (Florida International University), Joseph Dertien (Florida Department of Environmental Protection), Shanin Speas-Frost (Florida Department of Environmental Protection), Walsta Jean-Baptiste (Florida Department of Environmental Protection)

Principle Investigator for Project Title #1: Gang Chen and Scott Washman

Principle Investigator for Project Title #2: Youneng Tang

In Attendance:
Alireza Abbasi, Ashley Lin, Bruce Marvin, Benhur Asefaw, Chao Zhou, Dennis Ssekimpi, Gang Chen, Joseph Dertien, Kevin Warner, Lin Qi, Mojtaba Nouri Goukeh, Modupe Ojewumi, Natalia Soares Quinete, Paul E. Seaver, Shahin Alam, Shanin Speas-Frost, Timothy Townsend, and Youneng Tang

Project Presentation
The TAG meeting for the two projects started at 2:00 PM. Dr. Chen briefly introduced the background for combining TAG meetings for the two projects. Then, Lin Qi, PhD candidate in Dr. Chen group, presented the research plan of project #1. He started with introducing PFAS background and classification. In the presentation, he introduced PFAS adsorption mechanisms, including hydrophobic interaction, electrostatic interaction, and hydrogen bonding. He also provided information about PFAS partition to organics, *i.e.*, longer chain PFAS are more likely to be adsorbed. He noted that solution chemistry had an impact on PFAS adsorption. In the research plan, he described the experimental set-up to evaluate PFAS leaching, including the impact of pH, ionic strength, moisture content, and reaction time. For PFAS transport, the research plans are to enhance PFAS retention with engineered biochar addition, which will be described by the convection-dispersion equation.

Mojtaba Nouri Goukeh, a PhD candidate, presented the second project. He provided some background about volatile PFAS, and pointed out that fluorotelomer alcohols (FTOHs) are usually

the dominant group of volatile PFAS in many environmental settings. He further introduced that FTOHs had been used in many consumer products. In this project, the first task is to analyze 24 types of products for 5 different FTOHs. The 24 products were chosen based on a literature review. The analytes will be extracted by methanol and measured by solid phase microextraction (SPME) coupled with gas chromatography/mass spectrometry. He also explained the importance of hydrolysis for measuring FTOH precursors. The plan is to track FTOHs leaching in five types of simulated landfill waste. Finally, he presented the plan to determine the FTOHs leaching mechanisms by using 10 identical simulated landfills with one landfill sacrificed every month. At the end of each month, FTOHs and their precursors in the headspace gas and solid waste will be measured.

Group Discussion

Major comments and suggestions from the TAG members and responses from the research team are as follows:

- One of the TAG members asked how the two projects are related and collaborate with each other. The research team explained that with combined efforts, the two projects would benefit from each other and bring more significant outcomes. One project focuses on water-soluble PFAS while the other project focuses on volatile PFAS. These two types of PFAS (water-soluble versus volatile PFAS) may be transformed to each other. The PFAS analysis expertise and resources in each project will be used and helpful in the other project.
- One of the TAG members suggested considering the impact of air-water interface, Gibbs free energy, and Henry's law constant on mass transport during the PFAS fate experiments and modeling. The research group agreed on the importance of these factors and would consider these parameters during the analysis of the experiment data and in the modeling equations.
- One of the TAG members mentioned that biochar can be a sink for PFAS and there are many types of biochar. On the other hand, there is a potential of bringing PFAS to the process if biosolids are used as feedstock. For biochar that is commonly produced at 400 °C, PFAS likely will not be present. The team agreed and would be cautious when selecting the feedstocks for the engineered biochar for the experiments.
- One of the TAG members suggested measuring more volatile PFAS than FTOHs. She further suggested polyfluoroalkyl phosphate diesters (diPAPs). Some PFAS may be converted to FTOHs during measurement. The research team will review the literature on diPAPs measurement and then determine if they can be measured by the resources available to the research team.

The meeting was adjourned at 3:15 PM, minutes taken and submitted by Mojtaba Nouri Goukeh.