

**Minutes of the Technical Awareness Group Meeting**  
for the PFAS in Landfill Leachate Research  
Supported by the Hinkley Center for Solid and Hazardous Waste Management

**Meeting held, June 23, 2020, 2 to 4 pm (eastern)**  
Meeting Participation was through Virtual Connection  
Registration is required to attend this meeting via Zoom

**Attendees:**

*Speakers*

Atiye Ahmad, University of Florida College of Veterinary Medicine  
Hekai Zhang, University of Miami  
Helena Solo-Gabriele, University of Miami  
Nicole Robey, University of Florida  
Paola Mendoza-Perilla, University of Florida  
Timothy Townsend, University of Florida  
Yalan Liu, University of Florida  
Yutao Chen, University of Miami

*Attendees via computer webinar*

Ally Berry, St. Lucie County Solid Waste  
Arellys Roman, Miami Dade County Dept. of Solid Waste management  
Ashley Danley-Thomson, Florida Gulf Coast University  
Athena Jones, Superfund Project Manager in EPA Region 8  
Bob Curtis, SCS Engineers  
Christopher Prucha  
Dan Meeroff, Florida Atlantic University  
Ed Lontz, Columbia County Landfill  
Hilary Thornton, EPA Project Manager in EPA Region 4  
Himanshu Mehta, Indian River County Solid Waste Disposal Director  
Jake Thompson, PhD student  
Jeanette Rodriguez, Miami Dade County Solid Waste  
Jeff Foster, City of Jacksonville Solid Waste Division  
Jimmy Wills, Clay County Solid Waste  
John Bowden, University of Florida College of Veterinary Medicine  
John Schert, Executive Director of the Hinkley Center  
Kevin Wang, University of Florida College of Veterinary Medicine  
Kyle Clavier, University of Florida  
Liz Foeller, Waste Management Inc Manager  
Lois Rose, Sarasota County Solid Waste  
Milton Towns, Clay County Environmental Services Director  
Osman Karatum, System Progressor, Florida Gulf Coast University  
Pam Davis, Columbia County Landfill  
Raghuraman Venkatapathy, Pegasus Technical Services Manager  
Ramana Kari, Palm Beach County Solid Waste  
Richard Burns  
Rob Graessel, South Dade Landfill Environmental Resources Project Supervisor

Robert Shankle, Manatee County Solid Waste Division Manager  
Rula Deeb, Geosyntec Consultants  
Sam Levin, s2li Consultants  
Seth Ramaley, Groundwater Director for Waste Management in Southeast Area  
Thabet Tolymat, EPA Project Manager  
Virj de Sliva, SCS Environmental Consultants and Contractors  
Wester Henderson, Hinkley Center

*Additional logins*

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**Agenda**  
**TAG Meeting, PFAS in Landfill Leachate**

Date: June 23, 2020

Time: 2 pm to 4 pm (eastern)

Location: Virtual. See next page for details.

1. Welcome and introductions
2. Objectives and summary of completed PFAS Research
  - Objectives of Hinkley funded research Helena Solo-Gabriele
  - Results from Hinkley Project #1 (completed) Helena Solo-Gabriele
3. Updates on Hinkley Project #2 Yutao Chen/Hekai Zhang
  - PFAS in Florida landfills by waste and water type
  - PFAS in leachate on-site treatment systems
4. Updates on EPA Funded Research Tim Townsend
  - Objectives of EPA research Nicole Robey/John Bowden
  - PFAS extraction and analysis methods Yalan Liu
  - Plans for waste composition study Paola Mendoza-Perilla
  - Experimental plan for reverse osmosis
5. Next steps Helena Solo-Gabriele
  - U.S. wide study Tim Townsend
  - New Hinkley Center PFAS study
6. Additional question and answers, wrap up
7. Adjourn

Questions: [hmsolo@miami.edu](mailto:hmsolo@miami.edu)

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**Questions and Answer #1** (after Helena Solo-Gabriele, Hekai Zhang, Yutao Chen's presentation):

1. Q: For the gas condensate, was that gas well liquid? Or was it purely condensate from knock out pot or flare?

R: In project N0.1, the gas condensate sample location was combined leachate with gas condensate, but in the sampling day (particularly), there was a lot of gas condensate on the top. Landfill gas condensate is a liquid that is produced in landfill gas collection systems and is removed as the gas is withdrawn from landfills. In project No.2, the gas condensate samples would be collected from either gas well liquid or the purely condensate from the flare. We usually get the purely condensate sample from the gas flare station at the landfill. But if the flare station is not available to get the condensate sample, we can also get the condensate sample from the individual cell's gas well liquid.
2. Q: For the groundwater results, were those from wells documented to have landfill liquid impacts? Or were any from upgradient wells or wells with no documented landfill impact?

R: We usually defined the upgradient wells and downgradient wells from landfill report and Florida Oculus system. The landfill groundwater water report would show the shallow groundwater flow direction and well numbers information. So, we can define the upgradient and downgradient groundwater water wells in this way. And the information of the well would be confirmed by the operators. We believed the upgradient wells would not be impacted by the landfill. But a lot of the gradients are so flat; it's hard to tell what is upgradient wells sometimes.
3. Q: It looks like RO is the most efficient treatment system. After using RO, concentrate will have high concentration of PFAS. Do you have any suggestion how to dispose the concentrate? or any suggestions?

R: Usually, the RO concentrate would send back to the landfills. Because there is no other conventional way is effective to treat the concentrate PFAS.

**Question and Answers #2** (after Tim Townsend, Nicole Robey/John Bowden, Yalan Liu, Paola Mendoza-Perilla's presentation)

1. Q: Are the PFAS molecules too large to make it through the RO Membrane? Why is that?

R: Yes, the membrane itself usually is a very tight Polyamide (PA) membrane-based membrane. It is a very small size and large PFAS compounds can't go through it. However, there are some very small PFAS compounds we haven't test, typically the PFOA and PFOS are too large to get through the membrane. The PFOA and PFOS molecules usually have eight carbons and the fluorine is attached on them. So the size is too big to pass through the membrane, the membrane hole size is smaller than the compound itself. But, there may be some smaller PFAS compounds we have not measured yet, like those really small PFAS compounds are semi-volatile and volatile. We will be able to measure them with the GC method.
2. Q: Why are they good candidates for high energy treatment technologies? Highly concentrated pfas waste streams?

R: There is a lot of discussions here between the presenters and the audience and no confirmed explanation was given here. But Dan Meeroff provides a citation for his paper that may explain this question. It's called Economics of wastewater/biosolids treatment by electron beam technology. Meeroff, D. E., Bloetscher, F., & Shaha, B. (2020). Economics of

wastewater/biosolids treatment by electron beam technology. RaPC, 168, 108541.  
<https://www.sciencedirect.com/science/article/pii/S0969806X18311216?via%3Dihub>