

Technical Advisory Group Meeting **Florida Atlantic University**

Funded by the Hinkley Center for Solid and Hazardous Waste Management (HCSHWM)

DATE: Friday, December 2, 2016
TIME: Noon to 2 pm
WHERE: Engineering East (EE96), Room 303C Engineering Dean's Conference Room)
 777 Glades Road, Boca Raton, FL 33431

MEETING AGENDA

12:00 – 12:10 pm	Opening Address and Introduction of Participants	D. Meeroff
12:10 – 12:20 pm	Leachate Collection System Clogging	D. Meeroff
12:20 – 1:15 pm	Investigation of Effective Odor Control Strategies	J. Roblyer M. Vidovic
1:15 – 1:40 pm	Beneficial Reuse Solutions for Landfill Operations and Management	R. Sethi G. Quddus B. King J. de Almeida
1:40 – 1:50 pm	Open Forum	Participants
1:50 pm	Adjourn, Thank You	D. Meeroff

Attendance: Dr. Meeroff, Wester Henderson, Bertrand King, Rohan Sethi, Mateja Vidovic, Julia Roblyer, Patrick Carol, Angel Martinez, Joao De Almeida, Craig Ash, Joseph Lakner, Kevin Leo, Ravi Kadambala, Myles Clewner, Rebecca Rodriguez, Hala Sfeir, Craig Brown

Minutes of Meeting

- Opening address by D. Meeroff followed by introduction of the group members and participants present in the meeting as well as online participants (12:03pm)
- Dr Meeroff gave a presentation on results of electronic antiscaling system on behalf of B. Shaha who was out of the country for his wedding. He discussed monitoring results of calcium carbonate precipitation potential during operational changes at the landfill, electrochemical precipitation control system performance testing, acid addition for enhanced precipitate control, and impacts to the deep injection well. The major findings were as follows. Water quality data were normally distributed, and no statistically significant seasonal variation in water quality parameters except temperature were observed (colder in winter). Monthly rainfall during the study period followed historical patterns. Mass balanced pH and alkalinity did not agree with the observed values, so a pH adjustment was created. The average LSI of the mixed leachate did not change appreciably before and after implementation of dilution water intervention. Thus it seems that the flow regime may play a significant role (flushing). The adverse water quality effect at the addition of gas condensate at manhole 8 was noted. The role of sulfur reducing bacteria must be determined. For electronic scale control, no statistically significant differences in water quality parameters or crystal composition were noted in the side-by-side above ground leachate loop testing. The major component of the solids was found to be calcite (CaCO₃) from

XRD/XRF analysis. For acid management, the average buffering capacity of the leachate samples were determined. The average value was 1.2 mL of 1.0M HCl per 100 mL in previous testing and 1.3 ± 0.9 mL of 1.0 M HCl per 100 mL (for MH 13, 8, and 5). Attempts at replacing HCL with a weak acid increased the chemical requirement by about 2-3 times, but addition of strong acid reduces the dilution water requirement to reach neutrality for the LSI. At the deep injection well, the LSI model estimates matched well with the measured values after a pH adjustment was made prior to mass balancing. The addition of plant water from REF-1 and REF-2 did not adversely impact the water quality and the NEFCO wastewater had a beneficial effect on the LSI value. Some excellent suggestions and recommendations were put forward by the TAG members. R. Kadambala asked about injecting air instead of dilution water to increase turbulence. Meeroff responded by citing evidence that air addition increases the pH by almost one unit in a short amount of time (~1 hour), which would be counterproductive for reducing the LSI. P. Carrol talked about some of the recent innovations at SWA to combat the clogging problem and none of the strategies have had an adverse effect on the deep well. H. Sfier mentioned that LFG contains 50% carbon dioxide, which could be used to reduce the pH. If carbon dioxide can be economically separated from the LFG then carbon credits can be achieved from avoiding sending it to the flare and instead injecting into the diluted leachate to form carbonic acid that should bring the leachate pH down. Meeroff agreed to try this experiment in the lab in spring. K. Leo asked about the effect of the ash monofill on leachate water quality.

3 M. Vidovic gave a presentation on effective odor control strategies followed by defining the objective of categorizing and determining the patterns and trends of odor complaints. She discussed the odor causing compounds in solid waste operations along with methods to detect and monitor odor. She explained the factors influencing the strength of odors. She had two landfills being monitored for odor. She had results and conclusions based on the complaints and different factors taken into consideration for both landfills with different days of the week and time of the day. K. Leo asked if a correlation could be made to landfill operating conditions. M. Vidovic responded that this is the main challenge to find historical operational conditions going back 10 years. She also clarified that both landfills in the study receive MSW. F. Bloetscher mentioned that some of the key dates with the highest complaints may coincide with major meteorological events and asked M. Vidovic to investigate the correlation. P. Carrol mentioned that sometimes customer complaints end up being related to their own irrigation system hydrogen sulfide.

J. Roblyer gave a presentation on odorant binding protein. Roblyer explained about the experiment for the first attempt at cloning of proteins and discussed about the challenges faced in the current scenario.

4. R. Sethi gave a presentation on the upcoming project of diverting food waste and increasing methane content for biogas produced during anaerobic digestion. He talked about advantages from the unused capacity of an existing anaerobic digester. Then he discussed about the various steps involved in the process by starting with associated costs and assembling the stakeholders for the project by inviting other volunteers and candidates who want to participate in this project to assist in understanding the regulatory constraints. G. Quddus gave an introduction on anaerobic digestion and explained the different scenarios he has taken into consideration for his CO-EAT model. He had taken two scenarios with different numbers of supermarkets to explain the results and conclusions. J. de Almeida explained the methodology being used for lab scale anaerobic digester testing to determine the effect of food to sludge ratios on the production of biogas and the methane production potential which can be measured with a GEM 5000. B. King gave a presentation on the chemical composition of volatile fatty acids and explained the process of high performance liquid chromatography that will be utilized to measure the effect of different food to sludge ratios and anaerobic digestion conditions on the composition of VFAs to determine if a correlation exists. A brief discussion of tipping fees ensued. LFG/biogas fugitive emission losses were addressed. H. Sfier mentioned a paper that cited that no net losses of LFG were found from diversion of food waste from a landfill. Meeroff asked her if she could share the findings from that report.

- J. Lakner mentioned that if the LFG is less than 50% methane, this would not be acceptable for beneficial uses.
W. Henderson mentioned a facility in Memphis that might be useful to investigate.
5. Dr. Meeroff thanked all of the participants, and the meeting was adjourned at 1:32 pm.