



**COLLEGE OF ENGINEERING
AND COMPUTER SCIENCE**
FLORIDA ATLANTIC UNIVERSITY

Announces the Ph.D. Dissertation Defense of

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for the degree of Doctor of Philosophy (Ph.D.)

“Critical Evaluation of Leachate Clogging Potential in Gravity Collection Systems and Management Solutions”

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Virtual Dissertation

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ABSTRACT OF DISSERTATION

Critical Evaluation of Leachate Clogging Potential in Gravity Collection Systems and Management Solutions

Leachate clogging in the Leachate Collection System (LCS) due to chemical precipitations and biofilms produced by microbial activities is a common phenomenon in any Municipal Solid Waste (MSW) landfill. This study focuses on quantifying the factors that impact the micro-environment of leachate; and microbial activities that help the precipitates to form and attach to the LCS. It also evaluates the performance of operational changes that have been implemented or the potential alternatives and recommends the possible measures to reduce the severity of clogging. A field scale side-by-side pipe network, and several laboratory setups were used in this study. Calcite is identified to be the predominant phase present in the precipitates using XRD/XRF analysis which, concur with the previous studies. Microbial growth and activities enhance the precipitation of CaCO_3 in LCS. Clogging in LCS pipes can be controlled if not eliminated by continuous monitoring along with frequent cleaning with physiochemical processes.

BIOGRAPHICAL SKETCH

Born in Bangladesh

B.Sc., Bangladesh University of Engineering and Technology, Dhaka, Bangladesh, 2013

M.S., Florida Atlantic University, Boca Raton, Florida, 2016

Ph.D., Florida Atlantic University, Boca Raton, Florida, 2020

**CONCERNING PERIOD OF PREPARATION
& QUALIFYING EXAMINATION**

Time in Preparation: 2017 -2020

Qualifying Examination Passed: Fall 2017

Published Papers:

1. Shaha, B. N., & Meeroff, D. E. (2020). Prediction of H_2S Concentration in Landfill Gas Resulting from Construction and Demolition Debris and the Selection of Treatment Method. *Journal of Environmental Engineering*, 146(6), 04020045.
2. Shaha, B. N., Meeroff, D. E., Kohn, K., Townsend, T. G., Schert, J. D., Mayer, N., ... & Telson, J. (2019). Effect of Electronic Water Treatment System on Calcium Carbonate Scale Formation in Landfill Leachate Collection Piping. *Journal of Environmental Engineering*,

145(9), 04019052.

3. Meeroff, D. E., Shaha, B., Bloetscher, F., Esiobu, N., Mercer, B., McCorquordale, D., ... & Bennett, M. (2019). Characterization of Biofilms and Mineralogical Scale in Underground Injection Well Disposal of Landfill Leachate and Industrial Wastewater Streams. *Journal of Geoscience and Environment Protection*, 7(11), 69.
4. Meeroff, D. E., Bloetscher, F., & Shaha, B. (2019). Economics of wastewater/biosolids treatment by electron beam technology. *Radiation Physics and Chemistry*, 108541.
5. Shaha, B. N., Meeroff, D. E., & Kohn, K. Effect of an Electronic Water Treatment System on Calcium Carbonate Scaling: A Case Study. In *World Environmental and Water Resources Congress 2016* (pp. 41-50).
6. Meeroff, D. E., Lakner, J., Shaha, B., Walecki, E., Harris, A., & Meyer, L. (2016). Futuristic OnSite Leachate Management. In *World Environmental and Water Resources Congress 2016* (pp. 1-10).
7. A case study of the clogging of a leachate collection and removal system in a co-disposal landfill in the Southeastern United States. *Journal of Waste management* (In preparation).
8. Critical Evaluation of Leachate Clogging Potential in Gravity Collection Systems and Management Solutions. *Journal of Environmental Engineering* (In preparation).