



CSWEA Webinar Series

Wednesday – December 15, 2021

11:00 AM to 1:00 PM

Topic: Nutrient Removal

- 11:00 AM **Introduction – Faten Hussein, PhD Candidate | Marquette University**
- 11:05 AM **Utilizing full-scale continuous flow densification to unlock capacity and performance at WRRFs - Wendell Khunjar, PhD | Hazen & Sawyer**
In this work, we document successful densification of activated sludge at two full-scale facilities utilizing conventional bioreactors and secondary clarifiers. Densification was achieved through control of substrate utilization rates (kinetic selection) and use of anaerobic conditions (metabolic selection). Physical selection was not necessary to improve sludge settling characteristics at Plant A but was employed at Plant B. This presentation will outline how densified activated sludge (DAS) can be used to offset capital and operational investment.
- 11:40 AM **Evolution of enhanced biological phosphorus removal process towards sidestream configurations - Leon Downing, PhD, PE | Black & Veatch**
Biological nutrient removal (BNR) configurations have been implemented since the 1970s for biological nitrogen and phosphorus removal. As our understanding of the processes involved in BNR has grown, the approach to design and operation has evolved. This presentation will discuss how historic design and operating criteria were developed and provide the audience with a summary of where future design criteria are moving in terms of fermentative processes, dissolved oxygen setpoints, settleability control, and reactor configurations.
- 12:05 PM **“Low Energy Biological Nutrient Removal” - Don Esping | Brown and Caldwell**
Low energy nitrogen and phosphorus removal can be accomplished by operating at low dissolved oxygen (DO) conditions to promote simultaneous nitrification-denitrification (SND). This presentation highlights two case studies in which low DO operations with metabolic selectors and hydrocyclone based wasting were implemented for nutrient reduction and significant energy savings.
- 12:40 PM **Panel Q&A with all presenters**
- 1:00 PM **Adjourn**

CONTINUING EDUCATION

- 2.0 CEUs** for Operators in Illinois, Wisconsin & Minnesota.
Operator ID/Quiz required for webinar.
- 2.4 PDHs** for all Professional Engineers



COST

- \$15 – Members (Discount Code: CSWEA)
\$20 – Non-Members
\$5 – Student (Discount Code: Student)
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Speaker Bio's



Wendell Khunjar is an Associate Vice President and Director of Wastewater Innovation at Hazen and Sawyer. His recent work has focused on demonstrating new approaches for process intensification at WRRFs.



Dr. Leon Downing is a Principal Process Engineer and Innovation Leader with Black & Veatch from Madison, Wisconsin. Downing provides technology leadership in support of Black & Veatch process engineering and applied research projects globally.



Don Esping is a Vice President and Brown and Caldwell's Wastewater Process Engineering National Service Leader. For over 30 years, Don's work has focused on biological nutrient removal and process modeling.

Moderator Bio's

Faten Hussein is a PhD candidate in Civil, Construction & Environmental Engineering Department at Marquette University. Her research work is focusing on phosphorus removal and recovery using phosphate-binding protein.