



**LIFT Scholarship Exchange Experience for Innovation & Technology (SEE IT)  
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**TRIP REPORT**

**SCHOLARSHIP UTILITY:** *Upper Occoquan Service Authority, 14631 Compton Road, Centreville, VA 20121*

**SCHOLARSHIP UTILITY CONTACT:** *Juergen Roessler, Process Manager, juergen.roessler@uosa.org*

**ATTENDEES:** Matt Brooks, Juergen Roessler

**TRIP DATES:** 03/20/2018 – 03/24/2018

**UTILITIES/SITES VISITED:**

**Wastewater Treatment Plant Water Authority Vallei & Veluwe in EPE, Netherlands**

**VCS Denmark Ejby/Moelle Plant in Odense**

**TECHNOLOGIES/INNOVATIONS SEEN:** Granular Sludge BNR

**TRIP BACKGROUND and RATIONALE (250 WORDS):**

The Upper Occoquan Service Authority (UOSA) has been a world leader in the water reclamation/reuse field for the last 40 years and, in keeping, has recently undertaken a full-scale multi-year sludge granulation pilot study. For the duration of the study the 54 MGD UOSA plant will separate the secondary treatment system into two completely independent trains (no blending of mixed liquor or RAS). Train one will have two hydrocyclone clusters installed and operational 24/7 to separate and retain heavier biomass fraction of return activated sludge (RAS), the other train will operate as is typical for our plant operation. Secondary operating conditions/parameters will be matched as closely as possible between the two trains for the duration of the pilot study. The goals of this study are to thoroughly investigate the impacts of sludge granulation in our biological nutrient removal (BNR) system, with an emphasis on biomass settleability and resulting changes in microbial populations/floc structure. As part of this study, UOSA plans to characterize the nature, activity, and abundance of sludge granulation differences between the separate mixed liquors in our plant. We are certain that the research and experience gained from this full scale multiyear research project will be of great value to the scientific community as well as other BNR facilities interested in implementing this technology. Benefits of employing a granulated sludge process include; process intensification to achieve more capacity from existing infrastructure, reduce future capital construction costs, and reduction in a plants overall energy requirements.

Therefore we visited the first commercial granular sludge SBR plant in EPE, NL. After this visit we visited the granular sludge plant Ejby Mølle WWTP in Denmark and discussed treatment approaches, plant operations, and specifics of hydrocyclone operations. It helped us to better understand the Granular sludge technology, which has yet to prove successful in the U.S. at the UOSA pilot study and will unquestionably increase the overall likelihood of success of our project and lead to further applications of this technology in the U.S.

**TRIP SUMMARY (1 page max. Please include 10 photos and a 1-2 minute video montage from the trip. The video does not need to be professional, however if you have the means to create a professional video feel free to do so):**

*Please find the video files attached..*

*Both utilities are early adopters of the granular sludge technology, the plant in Denmark introduced the granular sludge process as part of their multi step process towards net positive energy balance. The VCS wastewater treatment plant in Odense Denmark also known as Ejby/Moelle plant has been applying hydro-cyclones to induce mainstream de-ammonification and to achieve better settling of secondary sludge. The Ejby Moelle plant is a 15.3 MGD facility. The plant produces 25% more energy as it consumes.*

A definite highlight of the trip was to experience the successful work by VCS Denmark, that was based on strategic evaluation of the Ejby/Moelle plant in 2011 with the goal to reach CO<sub>2</sub> neutrality in 2014. They shortlisted four optimization scenarios ready to implement, to reduce consumption and or increase generation of energy and to decrease greenhouse gas emissions. Long-term improvements to reach positive net energy status were also formulated.

Short Term Improvements –

- Chemically Enhanced Primary Clarification
- Shorter BNR system SRT
- Enhanced Ammonia based aeration control
- Reduce effluent filtration operation to 12hrs per day

Long term Improvements

- Co digestion of high strength waste
- Implementation of de-ammonification
- Investigating enhanced aeration by testing Membrane Aerated Bio Reactor (MABR)