29 June 2021 (Tuesday)

7.00pm-8.30pm (SGT) (GMT +8)
Session 2.6 – Integrated Water Reuse

Session Chair(s): Puah Aik Num, PUB, Singapore's National Water Agency (Singapore)

Perspectives on the Future of Water Reuse

I. Law. IBL Solutions (Australia)
Presenter is an invited speaker. No executive summary is available

Membrane Bioreactor For Indirect And Direct Potable Reuse Applications To Treat Primary Or Non-nitrified Secondary Wastewater Effluent

S. Liang, J. Lehman, H. Collins, M. Chaudhuri, J. Bednarski. Metropolitan Water District of Southern California (United States)

Metropolitan and the Sanitation Districts are partnering on implementation of a potential Regional Recycled Water Program (Program) to develop a drought-resistant water source for Metropolitan's member agencies. This Program would comply with regulatory requirements for indirect potable reuse (IPR) through groundwater replenishment and include a new advanced water treatment facility producing an ultimate flow of 568 MLD. The full-scale facility would treat primary or non-nitrified secondary effluent from the Sanitation Districts' wastewater treatment plant using an advanced water treatment train comprised of a membrane bioreactor, reverse osmosis, and advanced oxidation driven with ultraviolet light. The current focus of the Program is IPR through groundwater replenishment; however, an option to deliver advanced treated water to Metropolitan's water treatment plants as direct potable reuse (DPR) through raw water augmentation will also be evaluated. The 1.9 MLD advanced water treatment (AWT) demonstration facility will be operated for regulatory acceptance of MBR in a potable reuse AWT train for IPR and DPR in California.

Pulse Flow RO (PFRO) Technology

B. Liberman, L. Eshed, G. Greenberg. IDE Technologies (Israel)

Implementation of the new wastewater desalination technology as demonstrated in operation in Pismo Beach CA for nine months, from October 2018. The source of water is the secondary effluent of a municipal wastewater plant. The Unit operated with average flux of 28 LMH, which is 50% higher than the standard 18 LMH. Specific flux was 0.12 GFD/PSI, about 25% higher than that of the well-operated Orange County Waste Water Reuse Facility, which operates in the same recovery at specific flux of 0.09-0.1 gfd/psi. This indicates that the new WWRO technology is 25% more energy efficient than the standard conventional RO process. Operation was conducted at 86% recovery in a single RO stage. No chloramine was dosed, thus no NDMA components developed. Chloramine-free operation generates permeate with a UVT value of about 100%, thereby saving 30-40% on CAPEX and OPEX in the final UV/AOP stage.

Improvement of the Resilience of the NEWater Treatment Processes: A 1.7 MGD Demo Plant of Low Pressure UV Based Advanced Oxidation Processes in Singapore

S. Rüting, Y. Zhang, MX. Tan, J. Scheideler, J. Chin, PC. Siow, PW. Chue, E. Huang, KY. Lim, D. Lee, BR. Liu, FK. Chwee, B. Viswanath, GR. Ong, YH. Lou, AN. Puah, MH. Lim, Xylem Water Solutions Singapore Pte Ltd (Singapore)

A two year comprehensive Low Pressure UV based Advanced Oxidation Processes (AOP) study has come to completion in December 2019 by Xylem and PUB. The project is situated at Singapore's national water agency at one of the NEWater Factories in Singapore, from designing, building and operating a 1.7 MGD demo plant in real world conditions. The study focused on oxidative removal of over 20 spiked organic contaminants by using UV based AOP (UV/HOCl and UV/H2O2) in the process of NEWater production after Reverse Osmosis (RO) system. Target compounds selected include disinfection by-products (DBPs), Pharmaceuticals and Personal Care Products (PPCPs), Volatile Organic Compounds (VOCs) and Artificial Sweeteners. Variations of different operational parameters combination like UV dose, chemical dose and pH conditions were systematically studied for the evaluation of optimized operation conditions for AOP treatment plants. Results indicate that UV based AOP technology has the capability of removing certain targeted compounds effectively, without significantly changing the NEWater quality in terms of the generation of unwanted oxidation by products.