DBP Compliance Using Free Chlorine & Ceramic Membranes

Where: Caesars Forum**,** 3911 Koval Lane, Las Vegas, NV 89109

Booth Location: #205

Presentation Date & Time: Thursday, February 24th, 2022 / 8:15 AM – 8:45 AM

Authors: Steve Walden

A common method to reduce TTHM and HAA formation is to utilize chloramines in lieu of free chlorine for secondary disinfection. Chloramines react less with DOC and generally form less THMs and HAAs. However, Chloramines often create many unintended consequences. Chloramines are formed by adding ammonia with chlorine, and the nitrogen from the ammonia promotes bio-growth in the distribution lines which requires frequent free chlorine burn outs to remove the growth.

Chloramines do not provide any of the required Viral disinfection credits.-Thus pre-chlorination or other oxidative methods are required to achieve required CTs. Many non-regulated nitrogen-based DBPs are formed which can be significantly more toxic than DBPs formed by free chlorination based on recent research summary by the Water Research Foundation.

The ideal and lowest cost solution to prevent THM and HAA formation is to remove the majority of the THM and HAA precursors (NOM) in the raw source water without pre-chlorination or any other oxidative chemicals or processes (ie Ozonation). Once the THM & HAA precursors are removed, free chlorine can be used for secondary disinfection with minimal THM and HAA formation which is well below the MCLs.

The method to maximize NOM removal is through Ultra-Coagulation, which is performed by a novel continuous ultrafiltration process utilizing ceramic membranes. A low dosage of coagulant is added to the continuous ultra filtration process and the floc that is formed is concentrated about 100 times creating sweep floc coagulation. Sweep floc coagulation maximizes NOM removal over traditional coagulation processes (charge neutralization). Also, ultra-coagulation maximizes floc formation and negates the need for on-going operator adjustments of coagulant dosing and jar testing and pre-treatment of any kind.

The Ultra-coagulation process achieves significantly greater NOM and THM/HAA precursor removal versus traditional coagulation processes and allows existing plants that rely on chloramination to achieve DBP compliance to revert back to free chlorine.

Several case studies employing this novel Ultra-Coagulation process for THM and HAA prevention will be reviewed. Performance and operating cost data will be provided for process validation.