



Chemical Engineering & Applied Chemistry
UNIVERSITY OF TORONTO

January 4, 2016

To: All Stakeholders Interested in Ballast Water Management
Re: Performance Monitoring of BWMS

Recently, I was made aware of the December 14, 2015 posting in the Coast Guard Maritime Commons entitled "Coast Guard decision on use of Most Probable Number method" and was discouraged to read "that the Most Probable Number, or MPN, method is not considered as an equivalent alternative to the testing method prescribed in the Coast Guard's regulations pertaining to the type approval of ballast water systems." I feel that this decision will limit prominent and cost effective technologies from competing in the disinfection of ballast water, leading to sub-optimal and/or costly solutions for the maritime industry. In my opinion, this will lead to increased shipping costs and lead to the potential for lower compliance rates which will directly negatively impact the environmental integrity of our waterways.

I would like to emphasize that the scientific community and US drinking water and wastewater regulators not only recognize the validity of utilizing tests that measure the reproductive ability of target microorganisms (through grow out methods or culturing) to ensure the safety of drinking water, reuse water and wastewater, these tests are the standard and the norm. Disinfection, by definition, is the process of inactivating harmful microorganisms. The MPN method is well suited to test for the disinfectability of a given process.

Again, I would like to emphasize my concern that not including the MPN method as an equivalent testing method may lead to suboptimal solutions and may be detrimental to the environment. For example, before 1998, it was thought that a number of pathogenic cysts such as *Cryptosporidium parvum* and *Giardia lamblia* were not susceptible to UV disinfection treatment. Regulators were aware of the potential for future waterborne outbreaks such as the one that occurred in Milwaukee in 1993 that led to *Cryptosporidium* infection of 403,000 individuals and were considering either prohibitively expensive membrane technologies or potentially carcinogenic advanced chemical disinfection. Fortunately, it was soon discovered using grow out methods that UV is very effective at inactivating the cysts, providing the drinking water industry with a relatively inexpensive and very effective solution. Arguably, the Long Term 2 Enhanced Surface Water Treatment Rule could not have been promulgated without UV and the use of an infectivity test.

I would like to encourage the USCG to reconsider their decision to exclude MPN-based methods for the measurement of the performance of ballast water treatment systems. Both from a scientific and engineering perspective, these methods are proven and utilized around the world for ensuring both drinking water and wastewater treatment compliance. Please feel free to contact me if you have any questions.

Sincerely,

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