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RIGOROUS QUANTITATIVE DEMONSTRATION OF PATHOGEN REMOVAL BY DRINKING WATER TREATMENT PROCESSES: A SERIES OF CASE STUDIES

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The difficulty in accurately enumerating *C. parvum* and other pathogens has made it impractical to suggest or reasonably enforce regulatory guidelines. As a result, regulations like the USEPA's LT2ESWTR (Long-Term 2 Enhanced Surface Water Treatment Rule) utilize a toolbox approach by which utilities that require additional treatment for pathogen removal/inactivation have a variety of options for meeting this requirement. One of the options is "demonstration of system performance," which requires performance studies demonstrating reliable log removals. In the past, such studies have often been difficult to interpret because of unreliable analytical methods, making it difficult to compare studies and to reliably draw conclusions about treatment performance.

An assessment of filter operation on *Cryptosporidium* removal at one of the City of Ottawa's drinking water treatment plants demonstrated that oocyst-sized microspheres are a useful tool during filtration optimization studies and performance assessments. Since it is widely recognized that enumeration of micro-organisms such as *Cryptosporidium*, *Giardia*, and other organisms and particles in a water sample is a highly variable process, uncertainty in microbial data was also addressed. To ensure that the City of Ottawa's *Cryptosporidium* removal data were reliable, statistical approaches for quantifying the uncertainty associated with *C. parvum* concentration and removal data were developed. ***This performance demonstration and rigorous microbial quantitation were instrumental in obtaining an additional 1-log treatment credit for conventional filtration from the Ontario Ministry of the Environment***. Since then, this type of approach has applied to further optimization of filtration processes in its application to demonstrating that the chemical dependency of conventional filtration processes can be minimized by the use of engineered filtration media.

Monica Emelko is Associate Professor in the Department of Civil and Environmental Engineering at the University of Waterloo. She received her B.Sc. degree in Chemical Engineering from M.I.T., her M.Sc. degree in Environmental Engineering at U.C.L.A., and a Ph.D. in Civil and Environmental Engineering at the University of Waterloo. Her research involves a combined approach of experimental and statistical analysis, aimed to help understand the fate of waterborne pathogens in water supplies.

Friday, November 17th, 2006
Macdonald Campus, Raymond Building, Room 3-011
10:30 - 11:30 am

EVERYONE WELCOME

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