

Bloomberg School of Public Health

Department of Environmental Health Sciences
615 N. Wolfe Street / Room E6620
Baltimore MD 21205
Phone 410-614-5753 / Fax 410-955-9334
Kschwab@jhsph.edu

December 10, 2007

Dear Mr. O'Neal,

This synopsis report outlines our laboratory experiments involving the evaluation of ONIL Winfield and ONIL Berkefeld ceramic filter units. Both types of ceramic filters effectively removed bacteria from test waters with the Winfield filters on average removing one \log_{10} more than the Berkefeld. Briefly, our experimental protocol involved spiking 15 liters of laboratory-generated, buffered water (either phosphate buffered saline or 0.1% peptone water) or river water (i.e. an environmental sample) with the bacteria *Escherichia coli* (0.5 by 2 microns in size) and the virus MS2 bacteriophage (0.025 microns in size). Both microorganisms were spiked at a concentration between 10^4 to 10^6 per milliliter. The microorganism-containing water was gravity filtered through either Winfield or Berkefeld filters. Following filtration, the filtrate was assayed for levels of microbial removal. Multiple experiments were conducted (see Table) resulting in significant bacterial removal. As anticipated, due to their small size, viruses were not removed by the filter. In summary, the ceramic filters were effective in removing significant levels of bacteria from the source water and were amenable to repeated cleaning without appreciable loss of filter effectiveness. The filters are not effective in removing viruses (such as hepatitis A virus, rotavirus or norovirus) as determined by evaluating MS2 bacteriophage. Due to the efficient removal of bacteria, larger sized microorganisms such as the protozoa *Cryptosporidium* and *Giardia* should also be effectively removed. It is important to note that the treated water should be protected from recontamination in a safe storage vessel such as the vessel provided in the ONIL system. I would be happy to provide additional details and more information if needed.

Sincerely,



Kellogg J. Schwab Ph.D.
Associate Professor



Table: Bacterial and Viral removal following filtration through ONIL filters

ONIL Filtration Units (Winfield)

Sample Type	Sample Size	Bacterial Removal	Viral Removal
Environmental Sample	5	$> 4 - \log_{10}$	$< 1 - \log_{10}$
Laboratory Samples	7	$> 4 - \log_{10}$	$< 1 - \log_{10}$

ONIL Filtration Units (Berkefeld)

Sample Type	Sample Size	Bacterial Removal	Viral Removal
Environmental Sample	2	$> 3 - \log_{10}$	$< 1 - \log_{10}$
Laboratory Samples	4	$> 3 - \log_{10}$	$< 1 - \log_{10}$