Biological Consulting Services
of North Florida, Inc.

January 14, 2014

John Ruprecht
RapidPure Water Filtration
737 Quentin Avenue South
Lakeland, Minnesota 55043
P: (612) 940-9946

Re: Biological filtration efficacy testing of the provided "RapidPure 2.5" Filter; BCS ID 1401002.

To whom it may concern,

We have conducted the requested filtration efficacy study on the provided filter received on January 02nd, 2014. The experimental set up and challenge of the water filter was designed to evaluate the filters' microbiological contaminant removal efficacy. It is intended to demonstrate its efficacy throughout the test of the filter on the removal of parasitic, bacterial, and viral waterborne contaminants. The contaminant species and water parameters selected were based on NSF/ANSI water purifier testing protocols.

Following, you will find our report on the results of the challenge study. Should you have any questions, please do not hesitate to contact me.

Sincerely,

George Lukasik, Ph.D.
Laboratory Director

Johncruprecht@me.com

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FL DOH LABORATORY #E82924, EPA# FL01147
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Client: RapidPure Water Filtration
Samples: RapidPure 2.5" Filter; BCS1401002 received January 02, 2014.
BCS ID: 1401002
Test: Filtration Efficacy
Test Parameter: *Raoultella terrigena* (Bacteria), MS-2 Bacteriophage (virus), and 3.0 micron microspheres (parasite surrogate)
Performed and Analyzed by: George Lukasik, Ph.D. & Kintin Ng; January 09 - January 11, 2014

Challenge species	Filter influent average concentration	Percent removal of the challenge species by the filter initially** and following the passage of the indicated volume (liters) of laboratory grade reagent water***			
		1.0 liter	10 Liter	25 Liter	50 Liter
Bacteria: *Raoultella terrigena*[1]	3.45 x 10^5 cfu / ml	>99.9999%*	>99.9999%*	>99.9999%*	>99.9999%*
Virus: MS-2 Bacteriophage[2]	3.65 x 10^5 pfu / ml	>99.9999%*	>99.9999%*	>99.9999%*	>99.9999%*
Parasite: 3.0 micron microspheres[3]	1.8 x 10^4 spheres / ml	>99.998%*	>99.998%*	>99.998%*	>99.998%*

[1] *Raoultella terrigena* (ATCC 33257) was obtained from ATCC and propagated on Tryptic Soy Agar (TSA, Becton Dickinson, USA). It is used as a bacterial model to evaluate filters' bacterial removal efficacy. The bacteria was enumerated as colony forming units (cfu) following incubation at 36.5°C for 24 hours as per Standard method 9215C (APHA, 2012).
[2]Bacteriophage MS-2 (ATCC 15597-B1) was used as a model for human viruses. It is of similar shape and size to human enteroviruses and thus is used to determine filter's viral capture efficacy. It was enumerated using *E. coli* C3000 (ATCC 15597) as a host using the single layer plaque assay agar procedure as per EPA 1601.
[3] Three micron green fluorescent latex microspheres (Fluoresbrite® YG Microspheres 3.00µm, PolySciences Inc. PA, USA) were used as surrogates for *Cryptosporidium* oocysts. It is used to determine filter's parasitic removal efficacy. The microspheres were enumerated by fixing onto SingleSpot Slides (IDEXX, USA) and viewing by UV fluorescence microscopy.
* No species were detected in the filter effluent for the duplicate samples analyzed. Filter effluent samples were analyzed in duplicates at the minimum following collection.

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** Biological filtration challenge study description: Initially, one liter of Laboratory grade reagent water was passed through the filter using 2 PSI pressure. Water was passed at a flow rate of .5 liters/min. The indicated microbial species were added laboratory reagent water (pH 7.5±0.5) and the solution was placed in a pressure vessel. Five hundred milliliters of the challenge solution was passed through the filter using 2 PSI pressure at a flow rate of .5 liters/min. The filter effluent was collected in a sterile container. The flow rate was validated using a NIST traceable timer. The effluent was assayed for the respective species as per standard methods and Lab Standard Operating Procedures (SOP F-1). A sample of the influent was removed prior to the beginning of each challenge study and at the end of the study. All analysis was conducted in duplicate at the least. The number of microorganisms and microspheres was determined in each sample. The respective percent reductions were determined based on the concentration obtained in the filter influent and effluent.

***Following the initial challenge, the filter was connected to a supply of laboratory reagent water. Following the passage of the indicated volume of water (liters), the filter was removed and subjected to the challenge study described previously. The filtration efficacy following the passage of the indicated volume was calculated and reported. This was repeated for the indicated volumes in the tables. The cumulative volume passed through the filter was validated based on flow rate and time calculations using NIST traceable devices.

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Study data are summarized in the provided table(s). The results presented pertain only to the study conducted on the test articles/samples provided by the client (or client representative). The study was authorized and commissioned by the client. The results presented pertain only to the samples analyzed and identifier number(s) indicated. The data provided is strictly representative of the study conducted using the material/samples/articles provided by the client (or client's representative) and its (their) condition at the time of test. The study and data are obtained under laboratory conditions and may not be representative or indicative of a real-life process and/or application. Positive, negative, and neutralization controls were performed as outlined in the method and as per Good Laboratory Practices. All analyses were performed in accordance to laboratory practices and procedures set-forth by our NELAP/TNI accreditation standards (ISO 17025) unless otherwise noted. BCS makes no claims with regards to the express or implied warranty regarding the ownership, merchantability, safety or fitness for a particular purpose of any such property or product.

Signature of Laboratory Director/Authorized Rep. _____ Date: January 14, 2014

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