Biological Consulting Services
of North Florida, Inc.

June 12, 2012

Peter Coleman
Invisible Shield Technology
3365 Pine Walk Drive North, #203
Margate, FLORIDA, 33063

RE: Bacteriophage MS-2 disinfection efficacy study of the IS-SNP-1 and IS-DP solutions.

Dear Mr. Coleman

We have conducted the antiviral efficacy testing on the submitted solutions received on May 21, 2012. The testing was conducted according to a protocol developed to evaluate virucidal efficacy of spray disinfectants and particularly the efficacy of disinfectants on the inactivation of Nororovirus. The protocol is based on methodology described in ASTM E1053-97 (Standard Test Method for Efficacy of Virucidal Agents Intended for Inanimate Environmental Surfaces).

In the following pages, you will find a summary of the methodology used and the results of our study. Should you have any questions or concerns, please do not hesitate to contact me.

Best Regards,

George Lukasik, Ph.D.
Laboratory Director

pcoleman@ishieldtech.com
jworth@ishieldtech.com

BCS LABORATORIES INC.
4609 NW 6TH STREET, STE. A, GAINESVILLE, FLORIDA, 32609
TEL. (352) 377-9272, FAX. (352) 377-5630
WWW.MICROBIOSERVICES.COM
FL DOH LABORATORY #E82924, EPA# FL01147

Viral Cultures

MS2 (ATCC 15597-B1; 30 nm RNA virus specific for *Escherichia coli* C3000 ATCC 15597) was used in this study as surrogates for viral pathogens. The viruses were grown up to 10^9 plaque forming units (pfu) /mL in the laboratory prior to the challenge study. All bacteriophage stocks were filtered through a 0.22 µm membrane filter (Millipore, USA). Ten-fold dilutions of bacteriophage stock were made in sterile Phosphate Buffered Saline (PBS; 3M, NY). Phage was enumerated by a double layer agar overlay procedure using the respective host as per EPA 1602. Bacteriophage stocks were maintained 4°C until the initiation of the challenge study. For challenge experiments, stocks of MS-2 were diluted on the day of the study in reagent grade water.

Supplied disinfectant:

On May 21, 2012 two containers labeled IS-SNP-1 and IS-DP were received at our laboratory from Invisible Shield Technology. The samples were assigned BCS ID 12050114A & 1205114B.

BCS Laboratories Inc.
4609 NW 6th Street, Ste. A, Gainesville, Florida, 32609
Tel. (352) 377-9272, Fax. (352) 377-5630
www.microbioservices.com
FL DOH Laboratory #E82924, EPA# FL01147

Spray Disinfection Study: Initiated May 23, 2012 and conducted again on May 30, 2012.

The following study was conducted on two separate days using the protocol below. This was done to confirm the results.

One milliliter of the IS-DP was mixed with 127 ml of IS-SNP-1. The solution was placed in a clean sprayer bottle. The temperature of the disinfectant prior to application and during disinfection efficacy testing was maintained at 20-22°C.

Ten-microliters of the viral suspension was placed onto each of the seven sterile 20 x 26 x 0.4 mm glass slides (Allegiance Health Care, IL); Five slides were used for the spray disinfection (treated) and two slides were used as untreated positive survival controls that were not exposed to the spray disinfectant (initial). Additionally, two un-inoculated slides were used as a negative control. The inoculum was allowed to partially dry at 20-22°C for up to 30 minutes in a laminar flow biological cabinet. The five inoculated slides and the two uninoculated control slides were sprayed for 8 seconds from a distance of 8-10" with the solution. The slides were evenly and thoroughly saturated with the disinfectant. The slides were allowed to incubate at 20-22°C for 10 minutes. Immediately following

BCS Laboratories Inc.
4609 NW 6th Street, Ste. A, Gainesville, Florida, 32609
Tel. (352) 377-9272, Fax. (352) 377-5630
www.microbioservices.com
FL DOH Laboratory #E82924, EPA# FL01147

incubation, each slide was aseptically removed, and the slide was placed into a sterile 50 ml tube (Fisher scientific, PA) containing 20 milliliters of Neutralizing Buffer (BD, MD). The sprayed uninoculated negative control slides and the inoculated and unsprayed positive control slides were treated in the same manner as described above. The media in the tubes was then assayed for the presence of infectious virus particles by the plaque assay procedure described in EPA 1602.

Study data are summarized in the provided table(s). The results presented pertain only to the study conducted on the test articles 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 obtained under the laboratory conditions 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 express or implied warranty regarding the ownership, merchantability, safety or fitness for a particular purpose of any such property or product.

BCS Laboratories Inc.
4609 NW 6th Street, Ste. A, Gainesville, Florida, 32609
Tel. (352) 377-9272, Fax. (352) 377-5630
www.microbioservices.com
FL DOH Laboratory #E82924, EPA# FL01147

Table 1. The disinfection efficacy of the IS-SNP-1 and IS-DP solution on the inactivation of bacteriophage MS-2 used as a surrogate model for Norovirus.

Sample ID	Bacteriophage MS-2 PFU/ml	Average	Percent Reduction	Log_{10} Reduction
Untreated A	3.5×10^4	3.0×10^4	>99.9997%	>5.5
Untreated B	2.5×10^4			
Treated A	<0.5	<0.1		
Treated B	0.5			
Treated C	<0.5			
Treated D	<0.5			
Treated E	<0.5			
Negative controls	<0.5	<0.5	Acceptable	

BCS Laboratories Inc.
4609 NW 6th Street, Ste. A, Gainesville, Florida, 32609
Tel. (352) 377-9272, Fax. (352) 377-5630
www.microbioservices.com
FL DOH Laboratory #E82924, EPA# FL01147