



BIOLOGICAL CONSULTING SERVICES
OF NORTH FLORIDA, INC.

2020-12-18

Rick Muir
Sagan LLC
11777 Bernardo Plaza Court, Suite 208
San Diego CA 92128
858-675-3088 x 200
rick@saganfilters.com
Client ID: UltraFlo Unit A, UltraFlo Unit B, UltraFlo Unit C

BCS ID: 2011327, 2011328, 2011329

Project Name: Sagan 11192020 Microbial Filtration Efficacy Testing of provided Purifiers

Dear Rick Muir,

We have completed the filtration efficacy study on the submitted units as outlined below. The contaminant species, study conditions, and water parameters utilized were based on client's request and adaptation of the guidance documents and protocols listed below:

Validation of Water Purifier Microbiological Filtration Efficacy: Testing of performance as per client request; BCS SOP-F1 (ISO17025:2017 accredited).

Report Conclusion: Test Conducted successfully as per Client's Request

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

Sincerely,

George Lukasik, Ph.D.
Laboratory Director



Analysis: *R. terrigena* Filtration Efficacy

Test Water: General Test Water

Analysis Method: Spread Plating (Standard Method 9215)

Test Point: Initial Efficacy

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-09 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.6 Temp(C): 19.1

pH: 7.9 Turbidity (NTU): 0.2 TOC (ppm): 0.6 TDS(ppm): 206.9 Hardness(ppm): 134

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.5E+05 cfu/mL Ambient Temp(C): 21.3

Analysis Date: 2020-12-09 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 cfu/mL	% Reduct 1: >99.99992	Log10 Reduct 1: >6.1
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 cfu/mL	% Reduct 2: >99.99992	Log10 Reduct 2: >6.1
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 cfu/mL	% Reduct 3: >99.99992	Log10 Reduct 3: >6.1



Analysis: *R. terrigena* Filtration Efficacy

Test Water: General Test Water

Analysis Method: Spread Plating (Standard Method 9215)

Test Point: Performance at 250 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-09 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.8 Temp(C): 20.2

pH: 8.0 Turbidity (NTU): 0.2 TOC (ppm): 0.6 TDS(ppm): 206.5 Hardness(ppm): 131

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.6E+05 cfu/mL Ambient Temp(C): 24.8

Analysis Date: 2020-12-09 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 cfu/mL	% Reduct 1: >99.99992	Log10 Reduct 1: >6.1
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 cfu/mL	% Reduct 2: >99.99992	Log10 Reduct 2: >6.1
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 cfu/mL	% Reduct 3: >99.99992	Log10 Reduct 3: >6.1



Analysis: *R. terrigena* Filtration Efficacy

Test Water: General Test Water

Analysis Method: Spread Plating (Standard Method 9215)

Test Point: Performance at 500 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-10 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.8 Temp(C): 17.5

pH: 8.1 Turbidity (NTU): 0.2 TOC (ppm): 0.7 TDS(ppm): 188.2 Hardness(ppm): 137

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 4.4E+05 cfu/mL Ambient Temp(C): 21.5

Analysis Date: 2020-12-10 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 cfu/mL	% Reduct 1: >99.99993	Log10 Reduct 1: >6.2
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 cfu/mL	% Reduct 2: >99.99993	Log10 Reduct 2: >6.2
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 cfu/mL	% Reduct 3: >99.99993	Log10 Reduct 3: >6.2



Analysis: *R. terrigena* Filtration Efficacy

Test Water: General Test Water

Analysis Method: Spread Plating (Standard Method 9215)

Test Point: Performance at 750 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-10 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 21.0

pH: 8.4 Turbidity (NTU): 0.1 TOC (ppm): 0.7 TDS(ppm): 196.6 Hardness(ppm): 136

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.7E+05 cfu/mL Ambient Temp(C): 23.3

Analysis Date: 2020-12-10 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 cfu/mL	% Reduct 1: >99.99992	Log10 Reduct 1: >6.1
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 cfu/mL	% Reduct 2: >99.99992	Log10 Reduct 2: >6.1
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 cfu/mL	% Reduct 3: >99.99992	Log10 Reduct 3: >6.1



Analysis: *R. terrigena* Filtration Efficacy

Test Water: General Test Water

Analysis Method: Spread Plating (Standard Method 9215)

Test Point: Performance at 1,000 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-11 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.6 Temp(C): 17.3

pH: 8.1 Turbidity (NTU): 0.2 TOC (ppm): 0.6 TDS(ppm): 179.4 Hardness(ppm): 134

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 4.5E+05 cfu/mL Ambient Temp(C): 21.8

Analysis Date: 2020-12-11 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 cfu/mL	% Reduct 1: >99.99993	Log10 Reduct 1: >6.2
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 cfu/mL	% Reduct 2: >99.99993	Log10 Reduct 2: >6.2
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 cfu/mL	% Reduct 3: >99.99993	Log10 Reduct 3: >6.2



Analysis: *R. terrigena* Filtration Efficacy

Test Water: General Test Water

Analysis Method: Spread Plating (Standard Method 9215)

Test Point: Performance at 1,250 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-11 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 20.0

pH: 8.2 Turbidity (NTU): 0.1 TOC (ppm): 0.8 TDS(ppm): 199.3 Hardness(ppm): 129

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 4.6E+05 cfu/mL Ambient Temp(C): 23.3

Analysis Date: 2020-12-11 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters using Water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 cfu/mL	% Reduct 1: >99.99994	Log10 Reduct 1: >6.2
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 cfu/mL	% Reduct 2: >99.99994	Log10 Reduct 2: >6.2
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 cfu/mL	% Reduct 3: >99.99994	Log10 Reduct 3: >6.2



Analysis: *R. terrigena* Filtration Efficacy

Test Water: General Test Water

Analysis Method: Spread Plating (Standard Method 9215)

Test Point: Performance at 1,500 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-11 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.4 Temp(C): 21.3

pH: 8.2 Turbidity (NTU): 0.4 TOC (ppm): 0.8 TDS(ppm): 189.6 Hardness(ppm): 131

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 4.5E+05 cfu/mL Ambient Temp(C): 23.8

Analysis Date: 2020-12-11 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 cfu/mL	% Reduct 1: >99.99993	Log10 Reduct 1: >6.2
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 cfu/mL	% Reduct 2: >99.99993	Log10 Reduct 2: >6.2
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 cfu/mL	% Reduct 3: >99.99993	Log10 Reduct 3: >6.2



Analysis: *R. terrigena* Filtration Efficacy

Test Water: General Test Water

Analysis Method: Spread Plating (Standard Method 9215)

Test Point: Performance at 1,750 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-14 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 22.3

pH: 8.3 Turbidity (NTU): 0.2 TOC (ppm): 0.8 TDS(ppm): 204.1 Hardness(ppm): 139

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.7E+05 cfu/mL Ambient Temp(C): 24.5

Analysis Date: 2020-12-14 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 cfu/mL	% Reduct 1: >99.99992	Log10 Reduct 1: >6.1
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 cfu/mL	% Reduct 2: >99.99992	Log10 Reduct 2: >6.1
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 cfu/mL	% Reduct 3: >99.99992	Log10 Reduct 3: >6.1



Analysis: *R. terrigena* Filtration Efficacy

Test Water: General Test Water

Analysis Method: Spread Plating (Standard Method 9215)

Test Point: Performance at 2,000 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-14 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 22.1

pH: 8.1 Turbidity (NTU): 0.3 TOC (ppm): 0.7 TDS(ppm): 206.1 Hardness(ppm): 134

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.6E+05 cfu/mL Ambient Temp(C): 24.3

Analysis Date: 2020-12-14 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Unit 2011327 met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 cfu/mL	% Reduct 1: >99.99992	Log10 Reduct 1: >6.1
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: 9.1E-01 cfu/mL	% Reduct 2: 99.9998	Log10 Reduct 2: 5.6
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: 1.2E+00 cfu/mL	% Reduct 3: 99.9997	Log10 Reduct 3: 5.5



Analysis: MS-2 Virus Filtration Efficacy

Test Water: General Test Water

Analysis Method: Plaque Assay (BCS SOP V-10)

Test Point: Initial Efficacy

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-09 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.6 Temp(C): 19.1

pH: 7.9 Turbidity (NTU): 0.2 TOC (ppm): 0.6 TDS(ppm): 206.9 Hardness(ppm): 134

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.9E+05 pfu/mL Ambient Temp(C): 21.3

Analysis Date: 2020-12-09 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 pfu/mL	% Reduct 1: >99.99992	Log10 Reduct 1: >6.1
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 pfu/mL	% Reduct 2: >99.99992	Log10 Reduct 2: >6.1
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 pfu/mL	% Reduct 3: >99.99992	Log10 Reduct 3: >6.1



Analysis: MS-2 Virus Filtration Efficacy

Test Water: General Test Water

Analysis Method: Plaque Assay (BCS SOP V-10)

Test Point: Performance at 250 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-09 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.6 Temp(C): 20.2

pH: 8.0 Turbidity (NTU): 0.2 TOC (ppm): 0.6 TDS(ppm): 206.5 Hardness(ppm): 131

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 4.7E+05 pfu/mL Ambient Temp(C): 24.8

Analysis Date: 2020-12-09 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 pfu/mL	% Reduct 1: >99.99994	Log10 Reduct 1: >6.2
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 pfu/mL	% Reduct 2: >99.99994	Log10 Reduct 2: >6.2
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 pfu/mL	% Reduct 3: >99.99994	Log10 Reduct 3: >6.2



Analysis: MS-2 Virus Filtration Efficacy

Test Water: General Test Water

Analysis Method: Plaque Assay (BCS SOP V-10)

Test Point: Performance at 500 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-10 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.8 Temp(C): 17.5

pH: 8.1 Turbidity (NTU): 0.2 TOC (ppm): 0.7 TDS(ppm): 188.2 Hardness(ppm): 137

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.4E+05 pfu/mL Ambient Temp(C): 21.5

Analysis Date: 2020-12-10 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 pfu/mL	% Reduct 1: >99.99991	Log10 Reduct 1: >6.1
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 pfu/mL	% Reduct 2: >99.99991	Log10 Reduct 2: >6.1
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 pfu/mL	% Reduct 3: >99.99991	Log10 Reduct 3: >6.1



Analysis: MS-2 Virus Filtration Efficacy

Test Water: General Test Water

Analysis Method: Plaque Assay (BCS SOP V-10)

Test Point: Performance at 750 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-10 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 21.0

pH: 8.4 Turbidity (NTU): 0.1 TOC (ppm): 0.7 TDS(ppm): 196.6 Hardness(ppm): 136

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.4E+05 pfu/mL Ambient Temp(C): 23.3

Analysis Date: 2020-12-10 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 pfu/mL	% Reduct 1: >99.99991	Log10 Reduct 1: >6.1
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 pfu/mL	% Reduct 2: >99.99991	Log10 Reduct 2: >6.1
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 pfu/mL	% Reduct 3: >99.99991	Log10 Reduct 3: >6.1



Analysis: MS-2 Virus Filtration Efficacy

Test Water: General Test Water

Analysis Method: Plaque Assay (BCS SOP V-10)

Test Point: Performance at 1,000 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-11 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.6 Temp(C): 17.3

pH: 8.1 Turbidity (NTU): 0.2 TOC (ppm): 0.6 TDS(ppm): 179.4 Hardness(ppm): 134

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.7E+05 pfu/mL Ambient Temp(C): 21.8

Analysis Date: 2020-12-11 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 pfu/mL	% Reduct 1: >99.99992	Log10 Reduct 1: >6.1
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 pfu/mL	% Reduct 2: >99.99992	Log10 Reduct 2: >6.1
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 pfu/mL	% Reduct 3: >99.99992	Log10 Reduct 3: >6.1



Analysis: MS-2 Virus Filtration Efficacy

Test Water: General Test Water

Analysis Method: Plaque Assay (BCS SOP V-10)

Test Point: Performance at 1,250 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-11 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 20.0

pH: 8.2 Turbidity (NTU): 0.1 TOC (ppm): 0.8 TDS(ppm): 199.3 Hardness(ppm): 129

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 4.0E+05 pfu/mL Ambient Temp(C): 23.3

Analysis Date: 2020-12-11 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <3.0E-01 pfu/mL	% Reduct 1: >99.99993	Log10 Reduct 1: >6.1
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <3.0E-01 pfu/mL	% Reduct 2: >99.99993	Log10 Reduct 2: >6.1
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <3.0E-01 pfu/mL	% Reduct 3: >99.99993	Log10 Reduct 3: >6.1



Analysis: MS-2 Virus Filtration Efficacy

Test Water: General Test Water

Analysis Method: Plaque Assay (BCS SOP V-10)

Test Point: Performance at 1,500 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-11 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.4 Temp(C): 21.3

pH: 8.2 Turbidity (NTU): 0.4 TOC (ppm): 0.8 TDS(ppm): 189.6 Hardness(ppm): 131

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.4E+05 pfu/mL Ambient Temp(C): 23.8

Analysis Date: 2020-12-11 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: 6.1E-01 pfu/mL	% Reduct 1: 99.9998	Log10 Reduct 1: 5.7
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: 1.2E+00 pfu/mL	% Reduct 2: 99.9996	Log10 Reduct 2: 5.5
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: 2.1E+00 pfu/mL	% Reduct 3: 99.9994	Log10 Reduct 3: 5.2



Analysis: MS-2 Virus Filtration Efficacy

Test Water: General Test Water

Analysis Method: Plaque Assay (BCS SOP V-10)

Test Point: Performance at 1,750 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-14 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 22.3

pH: 8.3 Turbidity (NTU): 0.2 TOC (ppm): 0.8 TDS(ppm): 204.1 Hardness(ppm): 139

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.6E+05 pfu/mL Ambient Temp(C): 24.5

Analysis Date: 2020-12-14 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm			
Eff Conc 1: 6.4E+00 pfu/mL	% Reduct 1:	99.998	Log10 Reduct 1:	4.8	
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm			
Eff Conc 2: 1.3E+01 pfu/mL	% Reduct 2:	99.996	Log10 Reduct 2:	4.4	
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm			
Eff Conc 3: 7.9E+00 pfu/mL	% Reduct 3:	99.998	Log10 Reduct 3:	4.7	



Analysis: MS-2 Virus Filtration Efficacy

Test Water: General Test Water

Analysis Method: Plaque Assay (BCS SOP V-10)

Test Point: Performance at 2,000 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-14 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 22.1

pH: 8.1 Turbidity (NTU): 0.3 TOC (ppm): 0.7 TDS(ppm): 206.1 Hardness(ppm): 134

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 4.3E+05 pfu/mL Ambient Temp(C): 24.3

Analysis Date: 2020-12-14 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm			
Eff Conc 1: 2.4E+01 pfu/mL	% Reduct 1:	99.994	Log10 Reduct 1:	4.3	
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm			
Eff Conc 2: 2.7E+01 pfu/mL	% Reduct 2:	99.993	Log10 Reduct 2:	4.2	
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm			
Eff Conc 3: 1.9E+01 pfu/mL	% Reduct 3:	99.995	Log10 Reduct 3:	4.3	



Analysis: 3.0um Microspheres Filtration Efficacy (Cyst)

Test Water: General Test Water

Analysis Method: Fluorescent Microscopic Enumeration (EPA 1623.1)

Test Point: Initial Efficacy

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-09 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.6 Temp(C): 19.1

pH: 7.9 Turbidity (NTU): 0.2 TOC (ppm): 0.6 TDS(ppm): 206.9 Hardness(ppm): 134

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.6E+04 microspheres/mL Ambient Temp(C): 21.3

Analysis Date: 2020-12-09 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <6.7E-01 microspheres/mL	% Reduct 1: >99.998	Log10 Reduct 1: >4.7
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <6.7E-01 microspheres/mL	% Reduct 2: >99.998	Log10 Reduct 2: >4.7
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <6.7E-01 microspheres/mL	% Reduct 3: >99.998	Log10 Reduct 3: >4.7



Analysis: 3.0um Microspheres Filtration Efficacy (Cyst)

Test Water: General Test Water

Analysis Method: Fluorescent Microscopic Enumeration (EPA 1623.1)

Test Point: Performance at 250 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-09 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.8 Temp(C): 20.2

pH: 8.0 Turbidity (NTU): 0.2 TOC (ppm): 0.6 TDS(ppm): 206.5 Hardness(ppm): 131

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.1E+04 microspheres/mL Ambient Temp(C): 24.8

Analysis Date: 2020-12-09 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <6.7E-01 microspheres/mL	% Reduct 1: >99.998	Log10 Reduct 1: >4.7
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <6.7E-01 microspheres/mL	% Reduct 2: >99.998	Log10 Reduct 2: >4.7
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <6.7E-01 microspheres/mL	% Reduct 3: >99.998	Log10 Reduct 3: >4.7



Analysis: 3.0um Microspheres Filtration Efficacy (Cyst)

Test Water: General Test Water

Analysis Method: Fluorescent Microscopic Enumeration (EPA 1623.1)

Test Point: Performance at 500 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-10 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.8 Temp(C): 17.5

pH: 8.1 Turbidity (NTU): 0.2 TOC (ppm): 0.7 TDS(ppm): 188.2 Hardness(ppm): 137

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 2.5E+04 microspheres/mL Ambient Temp(C): 21.5

Analysis Date: 2020-12-10 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <6.7E-01 microspheres/mL	% Reduct 1: >99.997	Log10 Reduct 1: >4.6
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <6.7E-01 microspheres/mL	% Reduct 2: >99.997	Log10 Reduct 2: >4.6
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <6.7E-01 microspheres/mL	% Reduct 3: >99.997	Log10 Reduct 3: >4.6



Analysis: 3.0um Microspheres Filtration Efficacy (Cyst)

Test Water: General Test Water

Analysis Method: Fluorescent Microscopic Enumeration (EPA 1623.1)

Test Point: Performance at 750 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-10 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 21.0

pH: 8.4 Turbidity (NTU): 0.1 TOC (ppm): 0.7 TDS(ppm): 196.6 Hardness(ppm): 136

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 2.6E+04 microspheres/mL Ambient Temp(C): 23.3

Analysis Date: 2020-12-10 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <6.7E-01 microspheres/mL	% Reduct 1: >99.997	Log10 Reduct 1: >4.6
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <6.7E-01 microspheres/mL	% Reduct 2: >99.997	Log10 Reduct 2: >4.6
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <6.7E-01 microspheres/mL	% Reduct 3: >99.997	Log10 Reduct 3: >4.6



Analysis: 3.0um Microspheres Filtration Efficacy (Cyst)

Test Water: General Test Water

Analysis Method: Fluorescent Microscopic Enumeration (EPA 1623.1)

Test Point: Performance at 1,000 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-11 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.6 Temp(C): 17.3

pH: 8.1 Turbidity (NTU): 0.2 TOC (ppm): 0.6 TDS(ppm): 179.4 Hardness(ppm): 134

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.1E+04 microspheres/mL Ambient Temp(C): 21.8

Analysis Date: 2020-12-11 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <6.7E-01 microspheres/mL	% Reduct 1: >99.998	Log10 Reduct 1: >4.7
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <6.7E-01 microspheres/mL	% Reduct 2: >99.998	Log10 Reduct 2: >4.7
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <6.7E-01 microspheres/mL	% Reduct 3: >99.998	Log10 Reduct 3: >4.7



Analysis: 3.0um Microspheres Filtration Efficacy (Cyst)

Test Water: General Test Water

Analysis Method: Fluorescent Microscopic Enumeration (EPA 1623.1)

Test Point: Performance at 1,250 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-11 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 20.0

pH: 8.2 Turbidity (NTU): 0.1 TOC (ppm): 0.8 TDS(ppm): 199.3 Hardness(ppm): 129

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 2.7E+04 microspheres/mL Ambient Temp(C): 23.3

Analysis Date: 2020-12-11 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <6.7E-01 microspheres/mL	% Reduct 1: >99.998	Log10 Reduct 1: >4.6
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <6.7E-01 microspheres/mL	% Reduct 2: >99.998	Log10 Reduct 2: >4.6
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <6.7E-01 microspheres/mL	% Reduct 3: >99.998	Log10 Reduct 3: >4.6



Analysis: 3.0um Microspheres Filtration Efficacy (Cyst)

Test Water: General Test Water

Analysis Method: Fluorescent Microscopic Enumeration (EPA 1623.1)

Test Point: Performance at 1,500 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-11 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.4 Temp(C): 21.3

pH: 8.2 Turbidity (NTU): 0.4 TOC (ppm): 0.8 TDS(ppm): 189.6 Hardness(ppm): 131

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 3.2E+04 microspheres/mL Ambient Temp(C): 23.8

Analysis Date: 2020-12-11 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <6.7E-01 microspheres/mL	% Reduct 1: >99.998	Log10 Reduct 1: >4.7
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <6.7E-01 microspheres/mL	% Reduct 2: >99.998	Log10 Reduct 2: >4.7
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <6.7E-01 microspheres/mL	% Reduct 3: >99.998	Log10 Reduct 3: >4.7



Analysis: 3.0um Microspheres Filtration Efficacy (Cyst)

Test Water: General Test Water

Analysis Method: Fluorescent Microscopic Enumeration (EPA 1623.1)

Test Point: Performance at 1,750 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-14 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 22.3

pH: 8.3 Turbidity (NTU): 0.2 TOC (ppm): 0.8 TDS(ppm): 204.1 Hardness(ppm): 139

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 2.7E+04 microspheres/mL Ambient Temp(C): 24.5

Analysis Date: 2020-12-14 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <6.7E-01 microspheres/mL	% Reduct 1: >99.998	Log10 Reduct 1: >4.6
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <6.7E-01 microspheres/mL	% Reduct 2: >99.998	Log10 Reduct 2: >4.6
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <6.7E-01 microspheres/mL	% Reduct 3: >99.998	Log10 Reduct 3: >4.6



Analysis: 3.0um Microspheres Filtration Efficacy (Cyst)

Test Water: General Test Water

Analysis Method: Fluorescent Microscopic Enumeration (EPA 1623.1)

Test Point: Performance at 2,000 Gallons

Test Point Conclusion: Test Notes*

Challenge Date: 2020-12-14 Challenge Analysts: David Sekora M.S.

Initial Pres. (PSI): 60.3 Temp(C): 22.1

pH: 8.1 Turbidity (NTU): 0.3 TOC (ppm): 0.7 TDS(ppm): 206.1 Hardness(ppm): 134

Alkalinity(ppm): N/A Total Chlorine(ppm): 0.0 Polyphosphate (as ppm phosphorus): N/A

Influent Conc: 2.7E+04 microspheres/mL Ambient Temp(C): 24.3

Analysis Date: 2020-12-14 Analysts: David Sekora M.S.

Test Notes: Chlorine residual was not detected (Limit of detection is at 0.01 ppm).

*Tested units met the performance requirement set in method NSF P231 at the above test point using water with the specified parameters.

BCS Sample ID 1: 2011327	Client ID 1: UltraFlo Unit A	Flow Rate: 1.25 gpm
Eff Conc 1: <6.7E-01 microspheres/mL	% Reduct 1: >99.998	Log10 Reduct 1: >4.6
BCS Sample ID 2: 2011328	Client ID 2: UltraFlo Unit B	Flow Rate: 1.25 gpm
Eff Conc 2: <6.7E-01 microspheres/mL	% Reduct 2: >99.998	Log10 Reduct 2: >4.6
BCS Sample ID 3: 2011329	Client ID 3: UltraFlo Unit C	Flow Rate: 1.25 gpm
Eff Conc 3: <6.7E-01 microspheres/mL	% Reduct 3: >99.998	Log10 Reduct 3: >4.6



Project: Sagan 11192020 Microbial Reduction Efficacy Testing

Date Received: 2020-11-19 11:04

Test Start Date: 2020-12-09

Test End Date: 2020-12-17

System Type: Point Of Use (POU) System

Est. Capacity: 1,500 Gallons

Performance Indicating Device: No

Batch Volume: N/A

Batch, number per day: N/A

Test Cycle (min): N/A

Cycle On/Off (%): N/A

Restricted Flow Rate: No

Test Duration (hr/day): 16

Test Conditioning: Flush for 5 minutes with test water

Report Notes:

The purifier units were received from the study sponsor and each was assigned the referenced BCS identifier. The units were tested for their initial and lifetime efficacy for the removal of indicated microbial species from water. Following conditioning, each of the units were tested for initial bacteria, virus, and cyst reduction efficacy as per laboratory protocol. Briefly, aliquots of the challenge species were prepared as per guidance from protocol NSF P231, added to General Test Water (GTW (NSF P231), and the water was homogenized. Ten bed volumes of challenge water was passed through each unit and effluent was collected for analysis. The test was continued by passage of GTW and challenging at the indicated volumes. Study & analysis was conducted as per laboratory's accredited ISO17025:2017 methodology: bacteria as per SM 9215 (APHA 2012), virus as per BCS SOP V-10 (EPA1602), turbidity was determined as per SM2130B, pH as per SM4500HB, TDS as per SM2540, chlorine as per SM4500-Cl G, Total Organic Carbon (TOC) as per SM5310C, & hardness as per SM2340C (if needed). All analysis was conducted using calibrated and/or validated Instruments to traceable standards (NIST). All method QC was within method acceptance limit. No general environmental conditions are specified in the standard or have been identified that could affect the test results or measurements. END OF REPORT NOTES.



*I certify that I have examined and I am familiar with the information submitted herein. The results pertain only to the sample(s) tested, associated identifier #(s), and condition at receipt. Based on my inquiry of the individuals responsible for the analysis, I believe the data to be true, accurate, and complete. Unit descriptions and names were obtained from the submitted documents. The analysis was authorized and commissioned by the client or client's representative. The resulting data are representative of the analysis conducted on the collected samples and it's/their condition at the time of analysis. The data provided is strictly representative of the study conducted under laboratory conditions using the material/samples/articles provided by the client (or client's representative) and it's (their) condition at the time of test following receipt. The data obtained may not be representative or indicative of a real-life process and/or application. The sample(s) were analyzed in accordance with the appropriate method, however due to the inherent limitations of methods, microorganisms may avoid detection. BCS Laboratories offers no express or implied warranties concerning the quality, safety, and/or purity of any sample, batch, source, or the process they are derived from. Quality assurance controls were performed as outlined in the method and as per Good Laboratory Practices. Analyses were performed in accordance with laboratory practices and procedures set-forth by ISO 17025-2017 and NELAP/TNI accreditation standards 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.

Signature of Laboratory Director/Authorized Rep.  Date: 2020-12-17



Pictures:



Client: Sagan LLC

Project: Sagan 11192020 Microbial Reduction Efficacy Testing
BCS LABORATORIES, INC. — GAINESVILLE
4609 NW 6TH STREET, STE. A, GAINESVILLE, FLORIDA 32609
TEL. (352) 377-9272, FAX. (352) 377-5630
WWW.MICROBIOSERVICES.COM

FL DOH E82924, ISO 17025:2017 L2422 (ANAB), PA DEP 68-03950, EPA FLO1147
THIS REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF BCS LABORATORIES



*Balance ID: BL-10	Description: Sartorius Practum Precision Balance
Range of Function: 0-3100 g	Instrument Reporting Limit: 0.01g
Last Service Date: 2020-08-04	Service Due Date: 2021-08-31
Service Type: Manufacturer Cal	NIST Validation Instrument: Reference Std/Instrument
*pH Meter ID: PH-09	Description: Orion Versa Star Pro Meter w/pH and Conductivity Modules
Range of Function: 0.001-12.000	Instrument Reporting Limit: 0.001
Last Service Date: 2020-09-14	Service Due Date: 2021-09-30
Service Type: Validation to NIST	NIST Validation Instrument: NIST Standard Solution
*Conductivity Meter ID: CM-08	Description: Orion Versa Star Pro Meter w/pH and Conductivity Modules
Range of Function: 0.01-2400 ppm	Instrument Reporting Limit: 0.01ppm
Last Service Date: 2020-09-14	Service Due Date: 2021-09-30
Service Type: Validation to NIST	NIST Validation Instrument: NIST Standard Solutions
*Alkalinity Meter ID: N/A	Description:
Range of Function:	Instrument Reporting Limit:
Last Service Date:	Service Due Date:
Service Type:	NIST Validation Instrument:
*Hardness Meter ID: HARD-02	Description: Hach Total Hardness Test Kit 10-4,000 mg/L
Range of Function: 10-4000mg/L	Instrument Reporting Limit: 10 mg/L
Last Service Date: 2020-05-21	Service Due Date: 2021-05-21
Service Type: Validation to NIST	NIST Validation Instrument: NIST Standard solutions
*Turbidity Meter ID: TM-05	Description: Hach Turbidimeter
Range of Function: 0.00-999NTU	Instrument Reporting Limit: 0.01NTU
Last Service Date: 2020-09-24	Service Due Date: 2021-09-30
Service Type: Manufacturer OEM	NIST Validation Instrument: NIST Standard Solutions
*Spectrophotometer ID: SPEC-02	Description: Hach DR 3900 Spectrophotometer Colorimeter
Range of Function: 320-1000nm	Instrument Reporting Limit: 0.01nm
Last Service Date: 2020-01-07	Service Due Date: 2021-01-07
Service Type: Manufacturer service	NIST Validation Instrument: NIST Standard Solutions
Incubator ID: I-20	Description: Thermo Fisher Forma 29 cu. ft. Reach-In Incubator
Range of Function: 10-65C	Instrument Reporting Limit: 0.1C
Last Service Date: 2020-09-14	Service Due Date: 2021-09-30
Service Type: Annual Service	NIST Validation Instrument: Reference Std./Instrument



**Flow Meter ID 1: FM-64	Description: King 0.2-2.0 GPM (Liquid)
Range of Function: 0.2-2.0 gpm	Instrument Reporting Limit: 0.2 gpm
Last Service Date: 2020-03-08	Service Due Date: 2021-03-08
Service Type: Validation to NIST	NIST Validation Instrument: GC-5G-B
**Flow Meter ID 2: FM-82	Description: King GPM 0.2-2.0
Range of Function: 0.2-2.0 gpm	Instrument Reporting Limit: 0.2 gpm
Last Service Date: 2020-03-26	Service Due Date: 2021-03-26
Service Type: Validation to NIST	NIST Validation Instrument: GC-5G-B
**Flow Meter ID 3: FM-165	Description: King Instrument Flow Meter
Range of Function: 0.2-2.0 gpm	Instrument Reporting Limit: 0.2 gpm
Last Service Date: 2020-12-09	Service Due Date: 2021-12-09
Service Type: Validation to NIST	NIST Validation Instrument: GC-5G-B
Microscope ID: MIC-03	Description: Olympus BH-2 Microscope
Range of Function: 40X-400X Magnification	Instrument Reporting Limit: 0.5 micron
Last Service Date: 2020-08-04	Service Due Date: 2021-08-04
Service Type: Annual Service	NIST Validation Instrument: NIST Micrometer
Refrigerator ID: FR-11	Description: Migali B Series Glass Door Refrigerator
Range of Function: 1-8C	Instrument Reporting Limit: N/A
Last Service Date: 2020-09-14	Service Due Date: 2021-09-30
Service Type: Annual Service	NIST Validation Instrument: Reference Std./Instrument
Centrifuge ID: C-12	Description: Eppendorf centrifuge w/ cell culture package
Range of Function: 0-4400 RPM	Instrument Reporting Limit: 1 RPM
Last Service Date: 2020-09-14	Service Due Date: 2021-09-30
Service Type: Annual Service	NIST Validation Instrument: TA-01
Pressure Source Pump ID: Pump-90	Description: California Air Tools Ulta Quiet Air Compressor
Range of Function: 0-100 PSI	Instrument Reporting Limit: 1PSI
Last Service Date: N/A	Service Due Date: N/A
Service Type: N/A	NIST Validation Instrument: N/A
Pressure Meter ID: PM-37 NIS	Description: Sper pressure transducer (5 bar)
Range of Function: 0-72.5PSI	Instrument Reporting Limit: 0.1PSI
Last Service Date: 2020-08-24	Service Due Date: 2021-02-24
Service Type: Validation to NIST	NIST Validation Instrument: PM-58 NIST



Cert. Pressure Meter ID: PM-59 NIS Description: Pressure Transducer 72.5 PSI
Range of Function: 0-72.5 PSI Instrument Reporting Limit: 0.1 PSI
Last Service Date: 2020-11-11 Service Due Date: 2021-11-11
Service Type: Manufacturer Cal. NIST Validation Instrument: Reference Std./Instrument

TOC Analyzer ID: TOC-01 Description: GE M5310C Lab TOC Analyzer
Range of Function: 40ppb-50ppm Instrument Reporting Limit: 0.01ppb
Last Service Date: 2020-05-13 Service Due Date: 2021-05-13
Service Type: Manufacuter Cal. NIST Validation Instrument: NIST Standard Solutions

Spectrograph ID: N/A Description:
Range of Function: Instrument Reporting Limit:
Last Service Date: Service Due Date:
Service Type: NIST Validation Instrument:

Thermometer ID: IR-13 NIST Description: VWR Traceable Infrared Thermometer
Range of Function: 0-150 C Instrument Reporting Limit: 0.1C
Last Service Date: 2020-08-05 Service Due Date: 2021-08-05
Service Type: Calibration NIST Validation Instrument: Manufactuer calibration

Particle Counter ID: N/A Description:
Range of Function: Instrument Reporting Limit:
Last Service Date: Service Due Date:
Service Type: NIST Validation Instrument:

Timer ID: T-49 NIST Traceable Lap-Top Timer
NIST Expiration Date: 2021-11-04

*Validated at each day of use using NIST traceable standards. Other major equipment validated quarterly.

**Validated at each use using traceable volume and time measurements.

All above equipment with completed fields were used from Test Start Date to Test End Date unless otherwise noted. Service Date indicates PM or calibration by accredited service provider. Service Dates reported for latest period. If Last Service Date occurs during study duration, please contact us for the previous period's validation information.

END OF REPORT

