

BSW Group LLC  
7823 Village Drive  
Knoxville, TN 37919

November 19, 2019

## Pre and In-Treatment Air and Surface Report – University [REDACTED] – Equipment Room

### A. Summary – Air Samples

Pre and In-treatment air samples results given below.

Sample Date	Number of samples	Location	Average (cfu/m <sup>3</sup> )	Range	Standard Deviation	Percent Reduction
01/28/19	8	Various	679	400/833	150.9	-
11/04/19	8		<b>46</b>	0/100	37.0	<b>93.2</b>

### Background

All air samples were taken via the MB-1 air sampler, 30 liters per sample throughout the various locations given above with results normalized to colony forming units per cubic meter of air (CFU/m<sup>3</sup>).

Given below are the types of airborne organisms found in the above locations excluding the exterior samples during the 01/28/19 **pre-treatment** sampling.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	1,290	<i>Penicillium purpurogenum</i>	710
<i>Penicillium purpurogenum</i>	1,110	<i>Mortierella, spp</i>	255
<i>Cladosporium sphaerospermum</i>	1,050	<i>Basidiospores spp</i>	150
<i>Aspergillus fumigatus</i>	973	<i>Absidia, spp</i>	95

Displayed below are airborne organisms found in the above locations excluding the exterior samples during the 11/04/19 **in-treatment** sampling.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	155	<i>Penicillium purpurogenum</i>	< 5
<i>Penicillium purpurogenum</i>	125	<i>Mortierella, spp</i>	< 5
<i>Cladosporium sphaerospermum</i>	87	<i>Basidiospores spp</i>	< 5
<i>Aspergillus fumigatus</i>	< 5	<i>Absidia, spp</i>	< 5

01/28/19 – Pre-treatment bioburden in the sampled rooms are considerably above > 300 cfu/m<sup>3</sup>, which is not acceptable and needs corrective action.

11/04/19 – In-treatment set of samples post a **93.2% reduction** and is < **100 cfu/m<sup>3</sup>** which is considered **clean and acceptable**.

### Target Air Quality

Air quality scale for workplaces, public buildings, schools, and homes are as follows:

- < 100 cfu/m<sup>3</sup> is considered **clean and acceptable**.
- 100 to 300 cfu/m<sup>3</sup> is **marginal**.
- > 300 cfu/m<sup>3</sup> is **not acceptable** and needs corrective action.

In most cases, air quality < 100 cfu/m<sup>3</sup> has shown a decrease in the overall bioburden and odors.

### Predominant Microorganisms

Although the predominant organisms noted in this report are fungi, previous testing results show bacteria, viruses and protozoa are eliminated as effectively as fungi. The reactive oxygen species (ROS) generated is effective on gram +, gram – bacteria, protozoa, spores and viruses.



## B. Summary – Surface Contact Swabs

Pre and In-treatment surface (swab) samples results given below.

Sample Date	Number of samples	Location	Average (cfu/cm <sup>2</sup> )	Range	Standard Deviation	Percent Reduction
01/28/19	8	Various	43.1	12/105	28.7	-
11/04/19			<b>0.4</b>	0.1/1.0	0.3	<b>99.1</b>
01/28/19	1	Negative Control	0	0/0	-	-
11/04/19			0	0/0	-	-

01/28/19 - Pre-treatment contact swab results in the various locations are significantly > 10 cfu/cm<sup>2</sup>, which is not acceptable and needs corrective action.

11/04/19 - In-treatment contact swab results show a **99.1% reduction** and is now < **5 cfu/cm<sup>2</sup>** which is considered **clean and acceptable**.

### **Target Contact Surface Quality**

Contact surface quality scale for workplaces, public buildings, schools, and homes are as follows:

- < 5 cfu/cm<sup>2</sup> is considered **clean and acceptable**.
- 5 to 10 cfu/cm<sup>2</sup> is considered **marginal**.
- > 10 cfu/cm<sup>2</sup> is considered **not acceptable** and needs corrective action.

In most cases, surface quality < 5 cfu/cm<sup>2</sup> has shown a decrease in the overall bioburden and odors.

Please contact me if there are questions or if further information is needed.

Respectfully submitted,

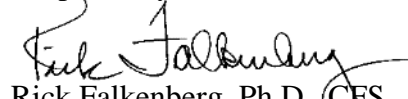
  
Rick Falkenberg, Ph.D., CFS  
Senior Principal Scientist



Table #1

University [REDACTED], Equipment Room  
11/04/19 In-treatment Air Sample Results - CFU/m<sup>3</sup>

In-treatment 11/04/19							
Plate Lot No.	Air Sample Plate #	Test Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m <sup>3</sup>
N/A	N/A	Ctrl	Unopened	0	0	0	0
N/A	N/A	1	Aisle lockers 74 and 94	30	1	1	33
N/A	N/A	2	Room 201.04E towel rack	30	0	0	0
N/A	N/A	3	RM 201.04A center	30	3	3	100
N/A	N/A	4	TV Lounge center	30	1	1	33
N/A	N/A	5	Aisle lockers 68 and 55	30	2	2	67
N/A	N/A	6	Rm 201.04A towel rack	30	1	1	33
N/A	N/A	7	Aisle lockers 22/7	30	0	0	0
N/A	N/A	8	Main entry	30	3	3	100

Avg	46	High	100
Low	0	SD	37.0

Total Adjusted Raw Count 11  
Total CFU/m<sup>3</sup> 367

Table #1, continued

University [REDACTED], Equipment Room  
01/28/19 Pre-treatment Air Sample Results - CFU/m<sup>3</sup>

Pre-treatment 01/28/19							
Plate Lot No.	Air Sample Plate #	Test Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m <sup>3</sup>
N/A	N/A	Ctrl	Unopened	0	0	0	0
N/A	N/A	1	Aisle lockers 74 and 94	30	24	25	833
N/A	N/A	2	Rm 201.04E Towle Rack	30	14	14	467
N/A	N/A	3	Rm 201.04A Center	30	23	24	800
N/A	N/A	4	TV Lounge center	30	21	22	733
N/A	N/A	5	Aisle lockers 68 and 55	30	19	20	667
N/A	N/A	6	Rm 201.04A towel rack	30	23	24	800
N/A	N/A	7	Aisle lockers 22/7	30	12	12	400
N/A	N/A	8	Main entry	30	21	22	733

Avg	679	High	833
Low	400	SD	150.9

Total Adjusted Raw Count 163  
Total CFU/m<sup>3</sup> 5,433

# Scientific Air Solution



Table #2  
University [REDACTED], Equipment Room  
11/04/19 In-treatment Surface Sample Results – CFU/cm<sup>2</sup>

In-treatment 11/04/19						
Room	Swab Number	Test Location	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm <sup>2</sup>
N/A	CTRL	CTRL	Control swab	0	0	0
N/A	1	Card	Light switch laundry area	10x10x10	60	0.6
N/A	2	Card	Locker handle 44	10x10x10	10	0.1
N/A	3	Card	Cold water handle 1st sink	10x10x10	5	0.1
N/A	4	Card	Gatoraid Refridg handle 1st machine TV lounge	10x10x10	50	0.5
N/A	5	Card	Left arm of chair TV lounge	10x10x10	95	1.0
N/A	6	Card	Main exit push handle	10x10x10	70	0.7
N/A	7	Card	Seating area of locker 100	10x10x10	10	0.1
N/A	8	Card	Door handle 201.04D	10x10x10	12	0.1
				Avg	0.4	Max 1.0
				Min	0.1	SD 0.32

Total Adjusted Raw Count 312

Total CFU/cm<sup>2</sup> 3

Table #2, continued  
University [REDACTED], Equipment Room  
01/28/19 Pre-treatment Surface Sample Results – CFU/cm<sup>2</sup>

Pre-treatment 01/28/19						
Room	Swab Number	Test Location	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm <sup>2</sup>
N/A	CTRL	CTRL	Control swab	0	0	0
N/A	1	Card	Light switch laundry area	10x10x10	2,545	25.5
N/A	2	Card	Locker handle 44	10x10x10	1,275	12.8
N/A	3	Card	Cold water handle 1st sink	10x10x10	1,200	12.0
N/A	4	Card	Gatoraid Refridg handle 1st machine TV lounge	10x10x10	4,850	48.5
N/A	5	Card	Left arm of chair TV lounge	10x10x10	6,500	65.0
N/A	6	Card	Main exit push handle	10x10x10	10,500	105.0
N/A	7	Card	Seating area of locker 100	10x10x10	3,850	38.5
N/A	8	Card	Door handle 201.04D	10x10x10	3,780	37.8
				Avg	43.1	Max 105.0
				Min	12.0	SD 28.70

Total Adjusted Raw Count 34,500

Total CFU/cm<sup>2</sup> 345



Table #3

University [REDACTED], Equipment Room  
Air Sample Pictures

11/04/19 In-treatment

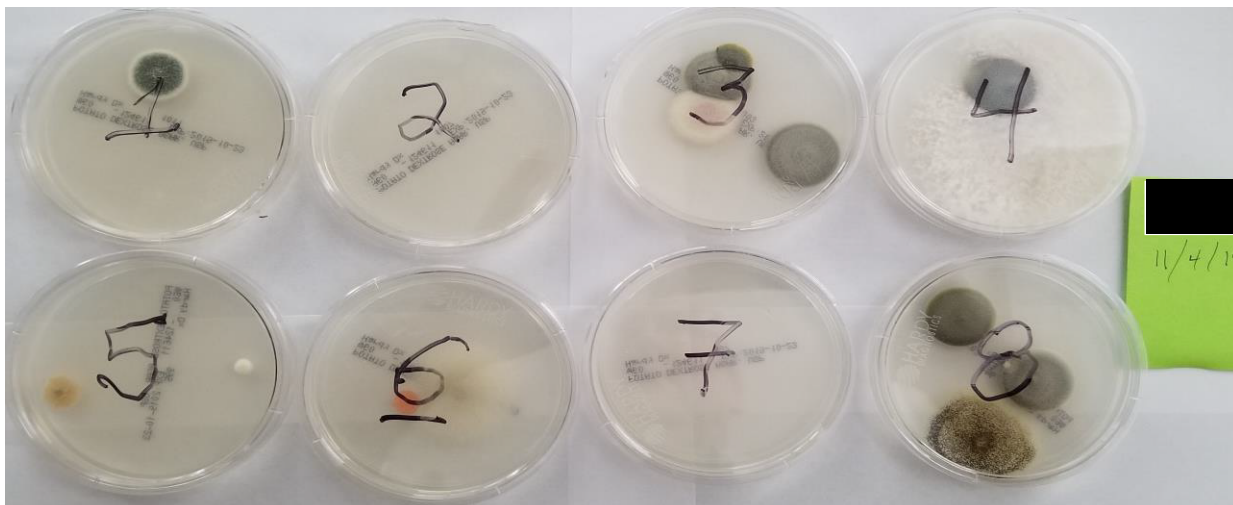
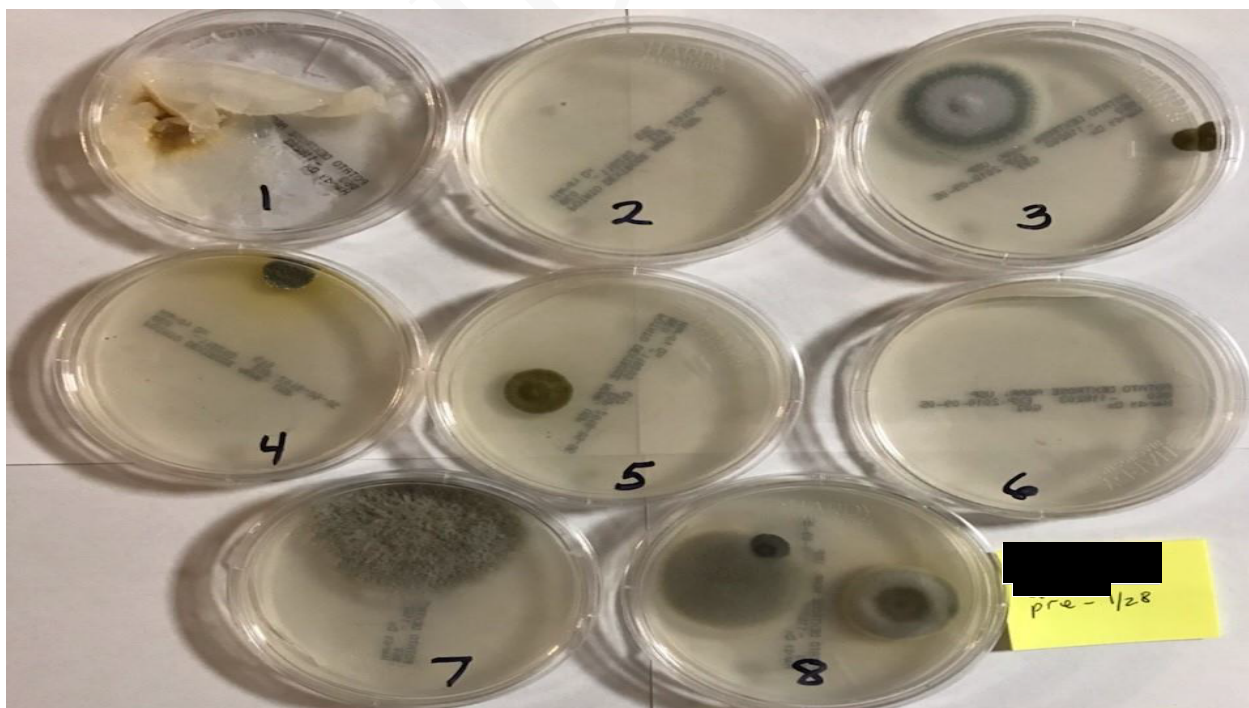


Table #3

University [REDACTED], Equipment Room, continued  
Air Sample Pictures

01/28/19 Pre-treatment





# Scientific Air Solution

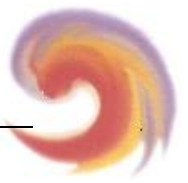


Table #4

University [REDACTED], Equipment Room  
11/04/19 and 01/28/19 - Air and Swab Sample Location Map

Rec 4/31

**airPHX®**  
**Air & Surface Testing Template**

Date: 1/28/2019

Facility: [REDACTED]

Pre/In-Test: Pre Test

Air Sample	Location
1	Aisle between Lockers for Athletes 74 and 94
2	Room 201.04E by Towel Rack
3	Room 201.04A Center
4	TV Lounge Center
5	Aisle between Lockers for Athletes 68 and 55
6	201.04C Towel Rack area
7	Aisle between locker 22/7
8	Main Entry Area

Swab Sample	Location
1	Light Switch Laundry Area
2	Locker Handle Locker 44
3	Cold Water Handle 1st Sink Faucet Right Shower Rm
4	Gatorade Refrigerator Handle 1st Machine TV Lounge
5	Left Arm of Chair in TV Lounge
6	Main Exit Push Handle
7	Seating area of Locker 100
8	Door Handle 201.04D

CONFIDENTIAL