



BSW Group LLC  
7823 Village Drive  
Knoxville, TN 37919

February 9, 2018

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

### 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 Difference
11/27/18	7	Various	571	333/800	162.7	-
01/10/19	6		<b>44</b>	0/100	31.4	<b>92.3</b>
11/27/18	3	Exterior	1,178	1,067/1,267	83.1	-
01/10/19						

### 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 this **pre-treatment** sampling.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	995	<i>Penicillium purpurogenum</i>	310
<i>Penicillium purpurogenum</i>	870	<i>Mortierella, spp</i>	255
<i>Cladosporium sphaerospermum</i>	750	<i>Basidiospores spp</i>	150
<i>Aspergillus fumigatus</i>	575	<i>Absidia, spp</i>	95

Shown below are finding of the types of airborne organisms found in the above locations excluding the exterior samples during this **in-treatment** sampling.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	112	<i>Penicillium purpurogenum</i>	< 10
<i>Penicillium purpurogenum</i>	85	<i>Mortierella, spp</i>	< 10
<i>Cladosporium sphaerospermum</i>	40	<i>Basidiospores spp</i>	< 10
<i>Aspergillus fumigatus</i>	28	<i>Absidia, spp</i>	< 10

**11/27/18 Pre-treatment** bioburden in the sampled areas showed a **92.3%** reduction and is now < 100 cfu/m<sup>3</sup> is considered **clean and acceptable**.

**01-10-19 In-treatment** bioburden in the sampled rooms are considerably above > 300 cfu/m<sup>3</sup>, which is not acceptable and needs corrective action.

### Observations

The original exterior air samples were again referenced which range from **1,067** to **1,267 cfu/m<sup>3</sup>** which indicates that most of the bioburden is coming from the outside air.

### 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.



## 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 Difference
11/27/18	7	Various	68.5	43.5/100	21.0	-
01/10/19	4		<b>3.7</b>	2.9/4.8	0.27	<b>94.6</b>
11/27/18	1	Negative Control	0	0/0	-	-
01/10/19			0	0/0	-	-

11/27/18 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.

01/10/19 in-treatment contact swab results showed a **94.6%** reduction and now is < **5 cfu/cm<sup>2</sup>** 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,

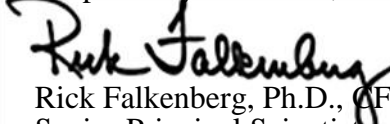
  
Rick Falkenberg, Ph.D., CFS  
Senior Principal Scientist



Table #1

University [REDACTED]

01/10/19 In-treatment Air Sample Results - CFU/m<sup>3</sup>

In-treatment 01/10/19							
Plate Lot No.	Air Sample Plate #	Test Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m <sup>3</sup>
425821	1454	Ctrl	Unopened	0	0	0	0
425821	1448	1	Men's restroom	30	3	3	100
425821	1447	2	Men's locker room	30	2	2	67
425821	1446	3	Men's shower	30	0	0	0
425821	1445	4	Women's locker room	30	0	0	0
425821	1008	5	Women's restroom	30	2	2	67
425821	1007	6	Women's shower	30	1	1	33
				Avg	44	High	100
				Low	0	SD	36.9
425821	1006	1	Exterior	30	35	38	1,267
425821	1006	2	Exterior	30	30	32	1,067
425821	1005	3	Exterior	30	33	36	1,200
				Avg	1,178	High	1,267
				Low	1,067	SD	83.1

Total Adjusted Raw Count 114  
Total CFU/m<sup>3</sup> 267

Table #1

University [REDACTED]

11/27/18 Pre-treatment Air Sample Results - CFU/m<sup>3</sup>

Pre-treatment 11/27/18							
Plate Lot No.	Air Sample Plate #	Test Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m <sup>3</sup>
425821	1454	Ctrl	Unopened	0	0	0	0
425821	1449	1	Inside exterior door	30	10	10	333
425821	1448	2	Men's restroom	30	14	14	467
425821	1447	3	Men's locker room	30	17	18	600
425821	1446	4	Men's shower	30	19	20	667
425821	1445	5	Women's locker room	30	12	12	400
425821	1008	6	Women's restroom	30	21	22	733
425821	1007	7	Women's shower	30	23	24	800
				Avg	571	High	800
				Low	333	SD	162.7
425821	1006	1	Exterior	30	35	38	1,267
425821	1006	2	Exterior	30	30	32	1,067
425821	1005	3	Exterior	30	33	36	1,200
				Avg	1,178	High	1,267
				Low	1,067	SD	83.1

Total Adjusted Raw Count 226  
Total CFU/m<sup>3</sup> 4,000



Table #2

University [REDACTED]

01/10/19 In-treatment Surface Sample Results – CFU/cm<sup>2</sup>

In-treatment 01/10/19						
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	Men	Sink	10x10x10	475	4.8
N/A	2	Men	Locker #39	10x10x10	325	3.3
N/A	3	Women	Sink	10x10x10	395	4.0
N/A	4	Women	Locker #47	10x10x10	285	2.9
				Avg	3.7	Max 4.8
				Min	2.9	SD 0.72
Total Adjusted Raw Count					1,480	
Total CFU/cm <sup>2</sup>					15	

Table #2

University [REDACTED]

11/27/18 Pre-treatment Surface Sample Results – CFU/cm<sup>2</sup>

Pre-treatment 11/27/18						
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	Main	Ice machine	10x10x10	5,500	55.0
N/A	2	Main	Main door	10x10x10	4,350	43.5
N/A	3	Men	Sink	10x10x10	8,700	87.0
N/A	4	Men	Locker #39	10x10x10	4,900	49.0
N/A	5	Women	Sink	10x10x10	10,000	100.0
N/A	6	Women	Locker #47	10x10x10	5,600	56.0
N/A	7	Women	Soak dispenser	10x10x10	8,900	89.0
				Avg	68.5	Max 100.0
				Min	43.5	SD 21.04
Total Adjusted Raw Count					47,950	
Total CFU/cm <sup>2</sup>					480	



Table #3

University [REDACTED]

Air Sample Pictures, updated Exterior Samples

01/10/19 In-treatment

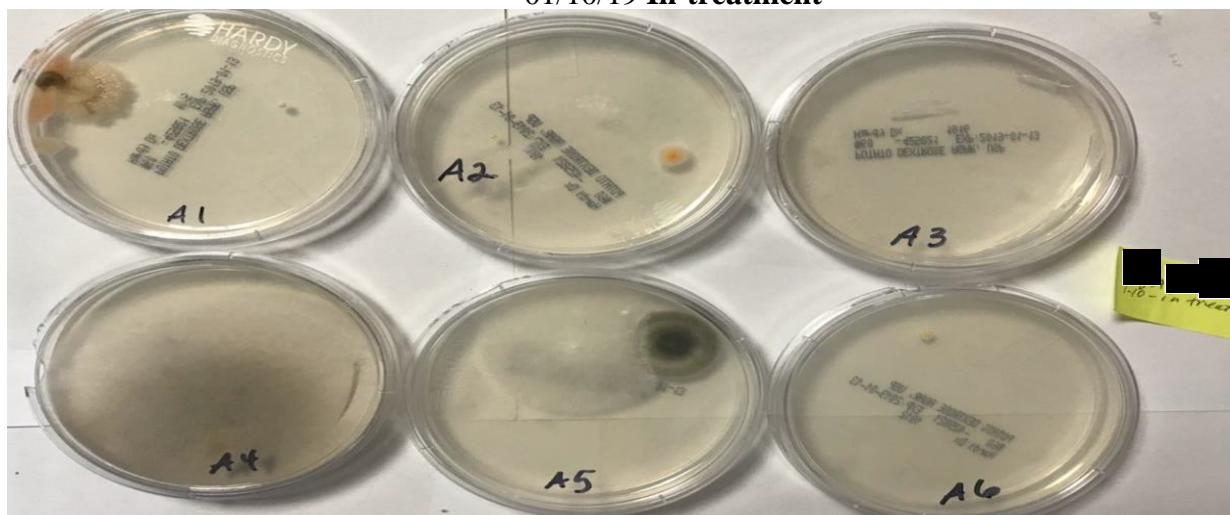


Table #3

University [REDACTED]

Air Sample Pictures, updated Exterior Samples

11/27/18 Pre-treatment

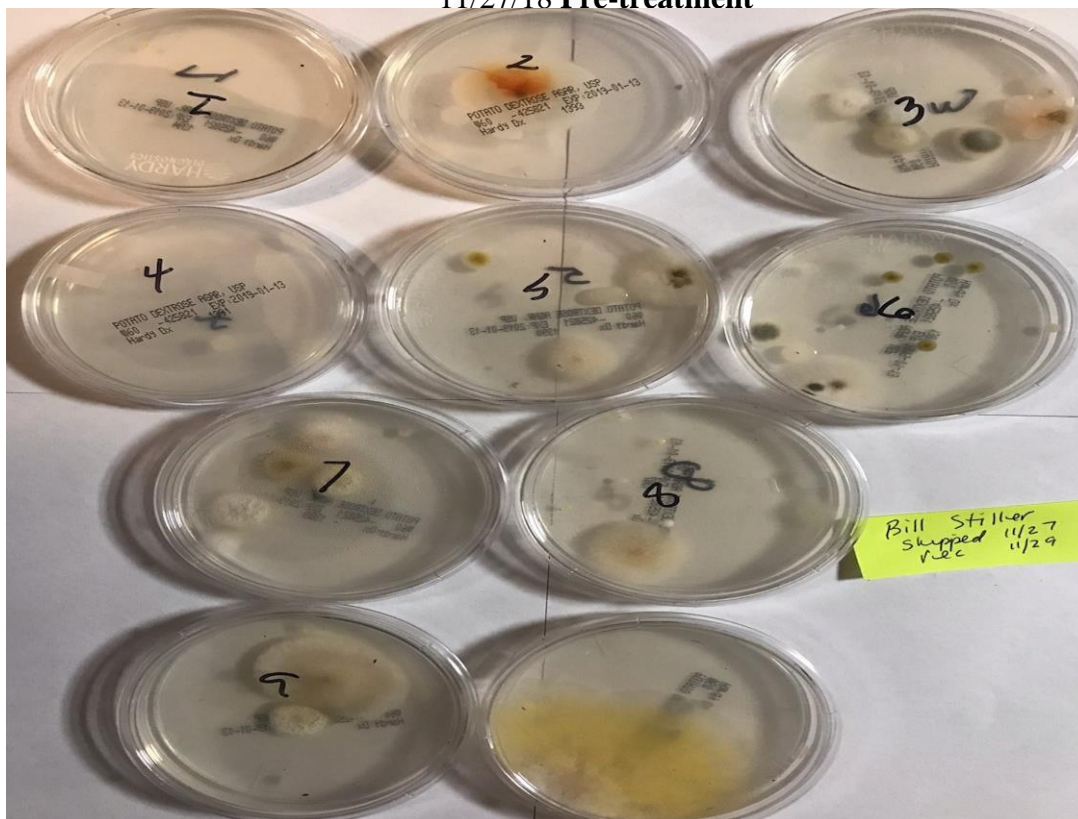
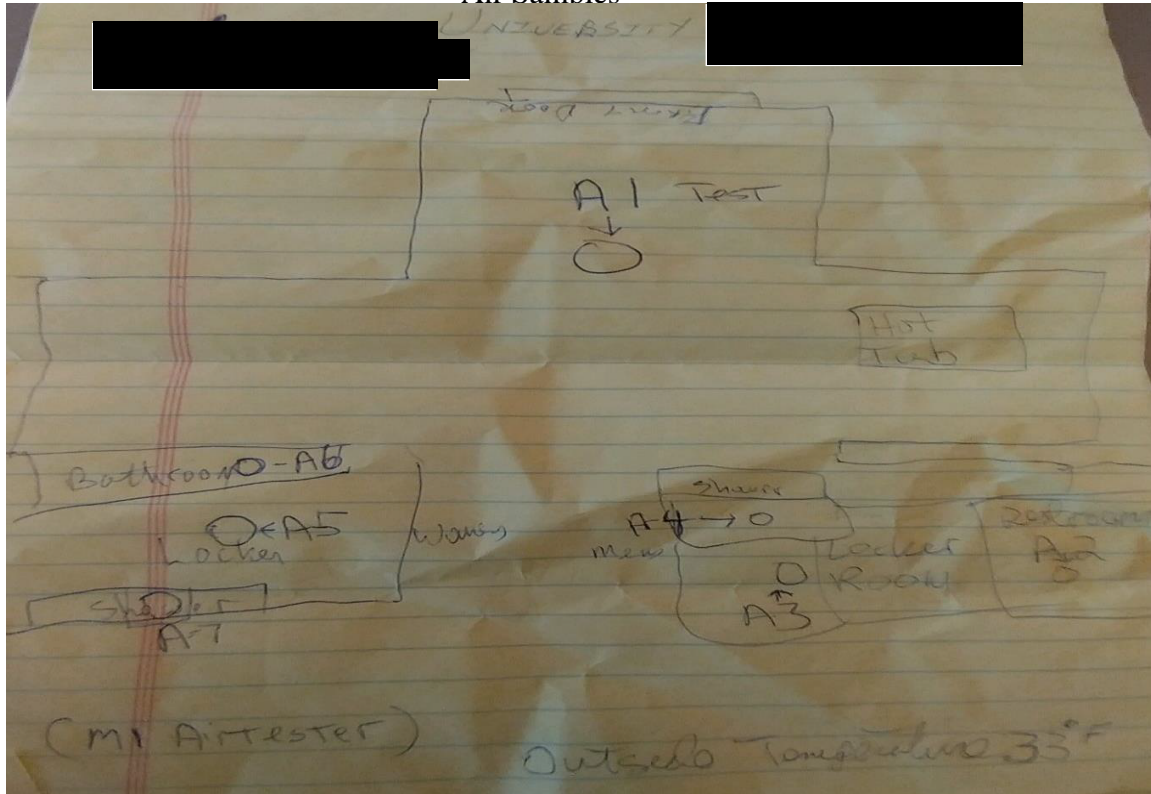






Table #4  
University [REDACTED]  
Air and Swab Sample Location Map

## Air Samples



## Swab Samples

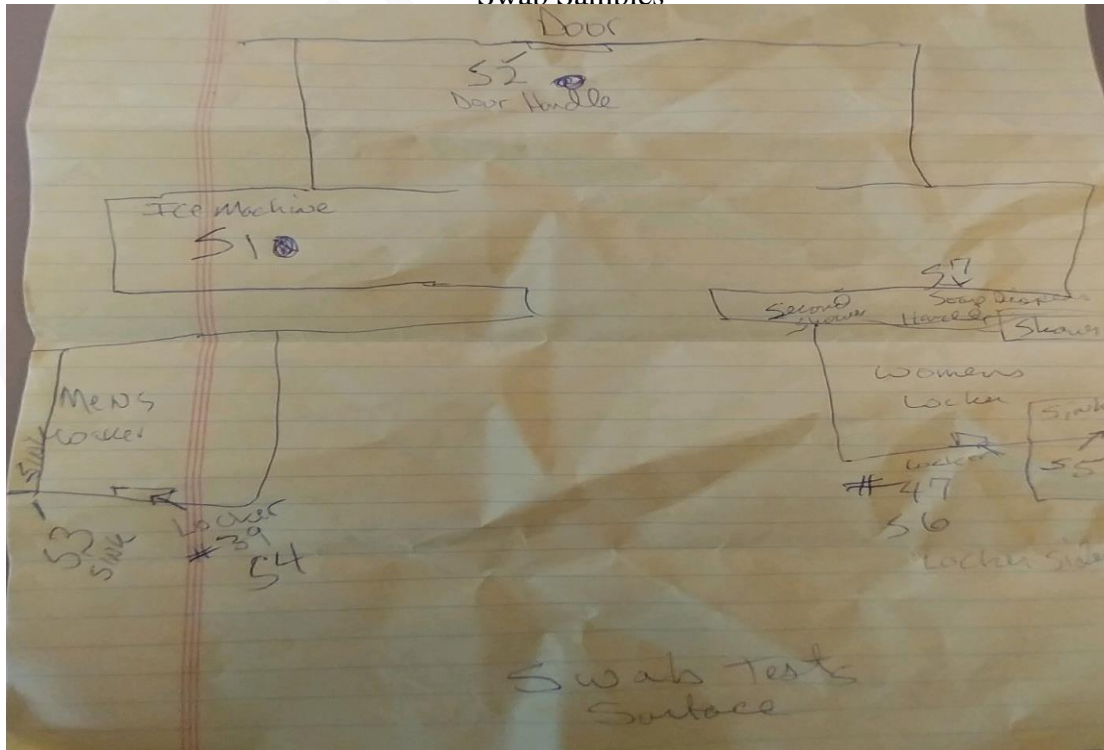


Table # 5

# Scientific Air Solutions



## University [REDACTED] Pictures of the Areas Examined

