



BSW Group LLC
7823 Village Drive
Knoxville, TN 37919

December 31, 2018

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

A. Summary – Air Samples

Pre and In-treatment air samples results given below.

Sample Date	Number of samples	Treatment	Location	Average (cfu/m ³)	Range	Standard Deviation	Percent Reduction
11/07/18	6	Pre	Various	939	633/1,267	234.5	-
12/21/18	6	In		83	33/133	31.9	91.2
11/07/18	2	Pre	Exterior	2,000	1,900/2,100	100.0	-
12/21/18	2	In		1,967	1,833/2,100	133.3	1.7

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/m³).

Given below are the finding of the types of airborne organisms found in the above locations excluding the outside during this **pre-treatment** sampling.

Species	Raw Count	Species	Raw Count
<i>Cladosporium sphaerospermum</i>	1,250	<i>Penicillium purpurogenum</i>	579
<i>Penicillium, aspergillus types</i>	1,050	<i>Absidia, spp</i>	486
<i>Penicillium purpurogenum</i>	870	<i>Mortierella, spp</i>	358
<i>Aspergillus fumigatus</i>	775	<i>Basidiospores spp</i>	265

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

Species	Raw Count	Species	Raw Count
<i>Cladosporium sphaerospermum</i>	210	<i>Penicillium purpurogenum</i>	< 10
<i>Penicillium, aspergillus types</i>	118	<i>Absidia, spp</i>	< 10
<i>Penicillium purpurogenum</i>	95	<i>Mortierella, spp</i>	< 10
<i>Aspergillus fumigatus</i>	77	<i>Basidiospores spp</i>	< 10

In-treatment 12/21/18 bioburden in the sampled locations show a **91.2% reduction** and are **now < 100 cfu/m³** and are considered **clean and acceptable**.

Pre-treatment 11/07/18 bioburden in the sampled rooms are significantly above > 300 cfu/m³, which is not acceptable and needs corrective action.

Observations

Outside air, samples ranged from **1,833 to 2,100 cfu/m³** showing a significant amount of the bioburden is continuing to come from the outside air, however, the airPHX unit is effectively reducing these counts.

Scientific Air Solutions



Target Air Quality

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

- $< 100 \text{ cfu/m}^3$ is considered **clean and acceptable**.
- 100 to 300 cfu/m^3 is **marginal**.
- $> 300 \text{ cfu/m}^3$ is **not acceptable** and needs corrective action.

In most cases, air quality $< 100 \text{ cfu/m}^3$ 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	Treatment	Location	Average (cfu/cm ²)	Range	Standard Deviation	Percent Reduction
11/07/18	11	Pre	Various	67.1	25.0/115.0	25.9	-
12/21/18		In		2.7	1.5/3.8	0.7	96.0
11/07/18	1	Pre	Negative control	0	0/0	-	-
12/21/18		In		0	0/0	-	-

In-treatment 12/21/18 contact swab results in the various locations show a **96% reduction** and are **now** $< 5 \text{ cfu/cm}^2$ is now considered **clean and acceptable**.

Pre-treatment 11/07/18 contact swab results in all the various locations are appreciably $> 10 \text{ cfu/cm}^2$, which is not acceptable and needs corrective action.

Target Contact Surface Quality

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

- $< 5 \text{ cfu/cm}^2$ is considered **clean and acceptable**.
- 5 to 10 cfu/cm^2 is considered **marginal**.
- $> 10 \text{ cfu/cm}^2$ is considered **not acceptable** and needs corrective action.

In most cases, contact surface quality of $< 5 \text{ cfu/cm}^2$ 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,

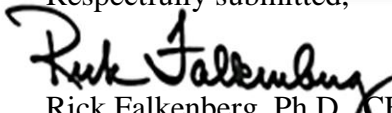

Rick Falkenberg, Ph.D., CFS
Senior Principal Scientist



Table #1

Church
12/21/18 In-treatment Air Sample Results - CFU/m³

In-treatment 12/21/18							
Plate Lot No.	Air Sample Plate #	Test Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m ³
N/A	145	Ctrl	Unopened	0	0	0	0
N/A	144	1	Mezzanine pool table	30	3	3	100
N/A	143	2	Mezzanine foosball	30	2	2	67
N/A	142	3	Fitness room east side	30	1	1	33
N/A	141	4	Fitness room west side	30	3	3	100
N/A	140	5	U track 1st backbord	30	2	2	67
N/A	139	6	L floor lounge center	30	4	4	133
N/A	138	1	Exterior - upper	30	49	55	1,833
N/A	137	2	Exterior - lower	30	55	63	2,100

Avg 83 High 133

Low 33 SD 31.9

Avg 1,967 High 2,100

Low 1,833 SD 133.3

Total Adjusted Raw Count 133
Total CFU/m³ 500

Table #1, continued

Church
11/07/18 Pre-treatment Air Sample Results - CFU/m³

Pre-treatment 11/07/18							
Plate Lot No.	Air Sample Plate #	Test Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m ³
N/A	145	Ctrl	Unopened	0	0	0	0
N/A	144	1	Mezzanine pool table	30	18	19	633
N/A	143	2	Mezzanine foosball	30	20	21	700
N/A	142	3	Fitness room east side	30	24	25	833
N/A	141	4	Fitness room west side	30	35	38	1,267
N/A	140	5	U track 1st backbord	30	29	31	1,033
N/A	139	6	L floor lounge center	30	32	35	1,167
N/A	138	1	Exterior - upper	30	55	63	2,100
N/A	137	2	Exterior - lower	30	50	57	1,900

Avg 939 High 1,267

Low 633 SD 234.5

Avg 2,000 High 2,100

Low 1,900 SD 100.0

Total Adjusted Raw Count 289
Total CFU/m³ 5,633



Table #2

Church

12/21/18 In-treatment Surface Sample Results – CFU/cm²

In-treatment 12/21/18						
Room	Swab Number	Test Location	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm ²
N/A	CTRL	CTRL	Control swab	0	0	0
N/A	1	BX-S	Main desk keyboard	10x10x10	150	1.5
N/A	2	BX-S	Fitness area scale	10x10x10	255	2.6
N/A	3	BX-S	Fitness outside door handle	10x10x10	275	2.8
N/A	4	BX-S	Fitness rower, keyboard & handle	10x10x10	310	3.1
N/A	5	BX-S	Sanitizer east end of fitness area	10x10x10	380	3.8
N/A	6	BX-S	Fitness area rec machine 1	10x10x10	280	2.8
N/A	7	BX-S	#1 treadmill left rail	10x10x10	300	3.0
N/A	8	BX-S	Coke machine, coke/diet options	10x10x10	235	2.4
N/A	9	BX-S	Mezzanine level -red couch arms	10x10x10	378	3.8
N/A	10	BX-S	Upper floor men's bathroom door	10x10x10	250	2.5
N/A	11	BX-S	Aerobics, outside door handle purell disp	10x10x10	200	2.0

Avg 2.7 Max 3.8
Min 1.5 SD 0.66

Total Adjusted Raw Count 3,013
Total CFU/cm² 30

Table #2, continued

Church

11/07/18 Pre-treatment Surface Sample Results – CFU/cm²

Pre-treatment 11/07/18						
Room	Swab Number	Test Location	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm ²
N/A	CTRL	CTRL	Control swab	0	0	0
N/A	1	BX-S	Main desk keyboard	10x10x10	11,500	115.0
N/A	2	BX-S	Fitness area scale	10x10x10	6,250	62.5
N/A	3	BX-S	Fitness outside door handle	10x10x10	5,100	51.0
N/A	4	BX-S	Fitness rower, keyboard & handle	10x10x10	8,250	82.5
N/A	5	BX-S	Sanitizer east end of fitness area	10x10x10	4,850	48.5
N/A	6	BX-S	Fitness area rec machine 1	10x10x10	4,500	45.0
N/A	7	BX-S	#1 treadmill left rail	10x10x10	2,500	25.0
N/A	8	BX-S	Coke machine, coke/diet options	10x10x10	5,200	52.0
N/A	9	BX-S	Mezzanine level -red couch arms	10x10x10	8,900	89.0
N/A	10	BX-S	Upper floor men's bathroom door	10x10x10	10,250	102.5
N/A	11	BX-S	Aerobics, outside door handle purell disp	10x10x10	6,500	65.0

Avg 67.1 Max 115.0
Min 25.0 SD 25.91

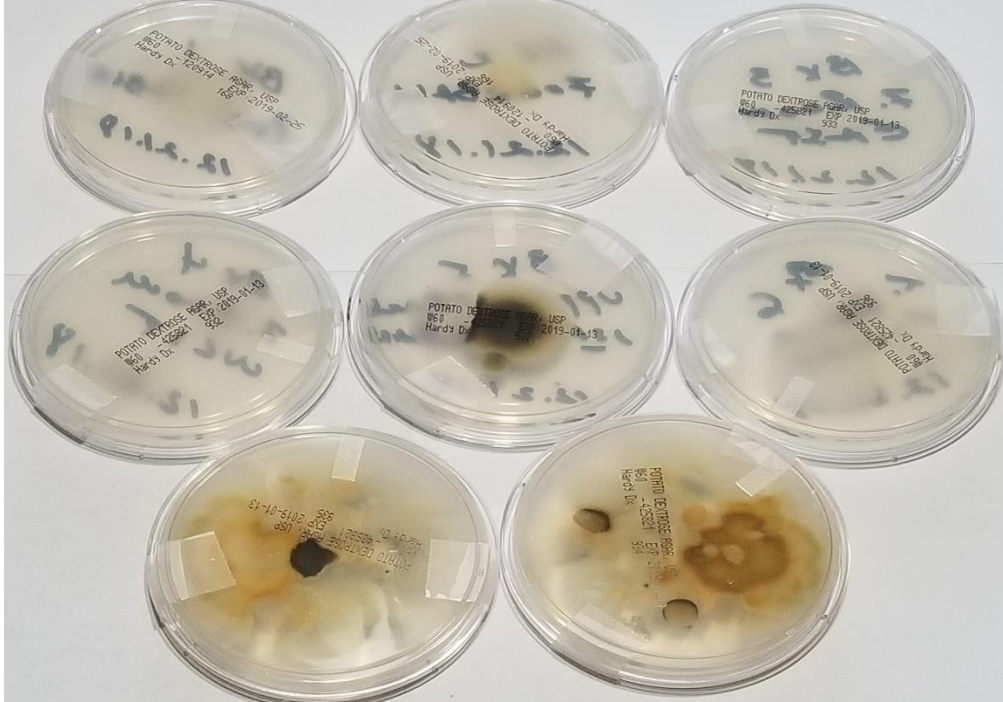
Total Adjusted Raw Count 73,800
Total CFU/cm² 738



Table #3

Church
Air Sample Pictures

12/21/18 In-treatment



11/07/18 Pre-treatment

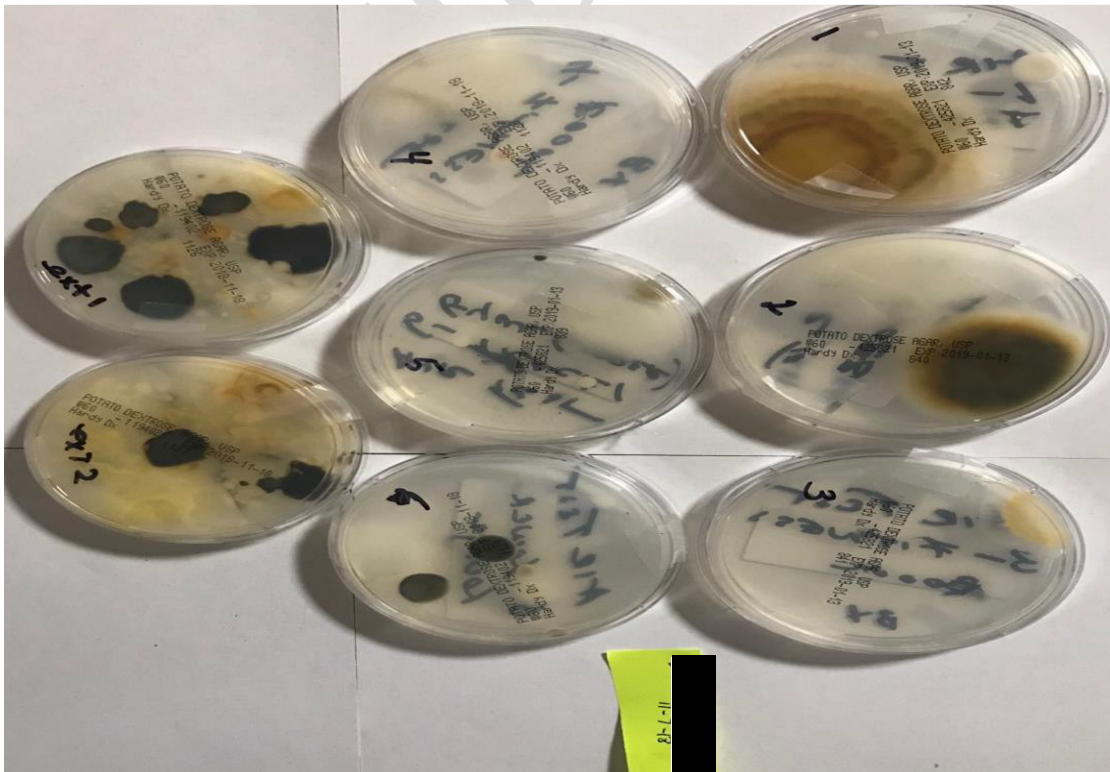




Table #4
Church
 In-treatment Air Sample Location Map

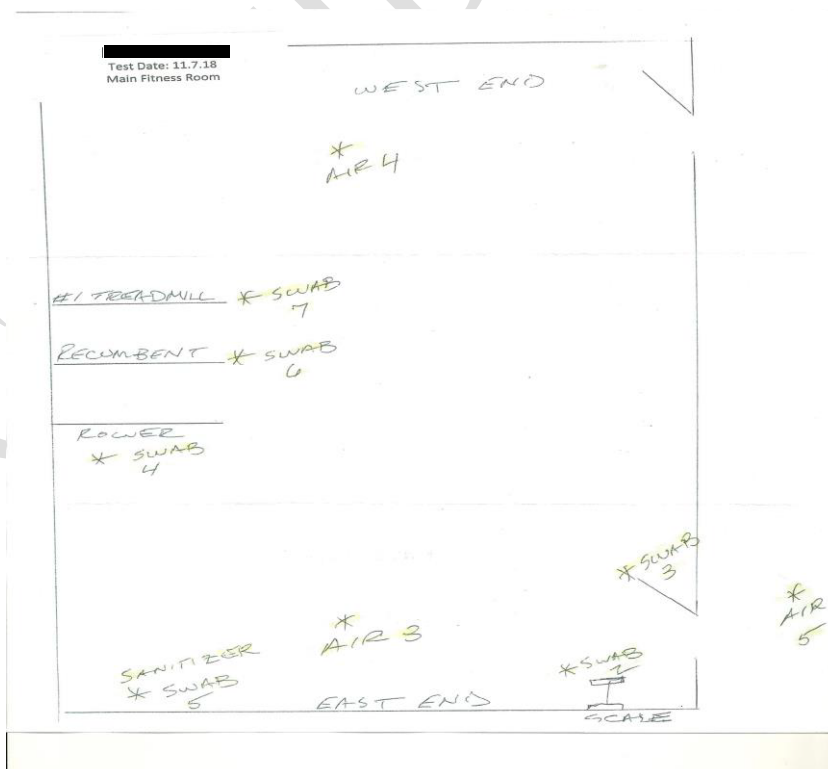
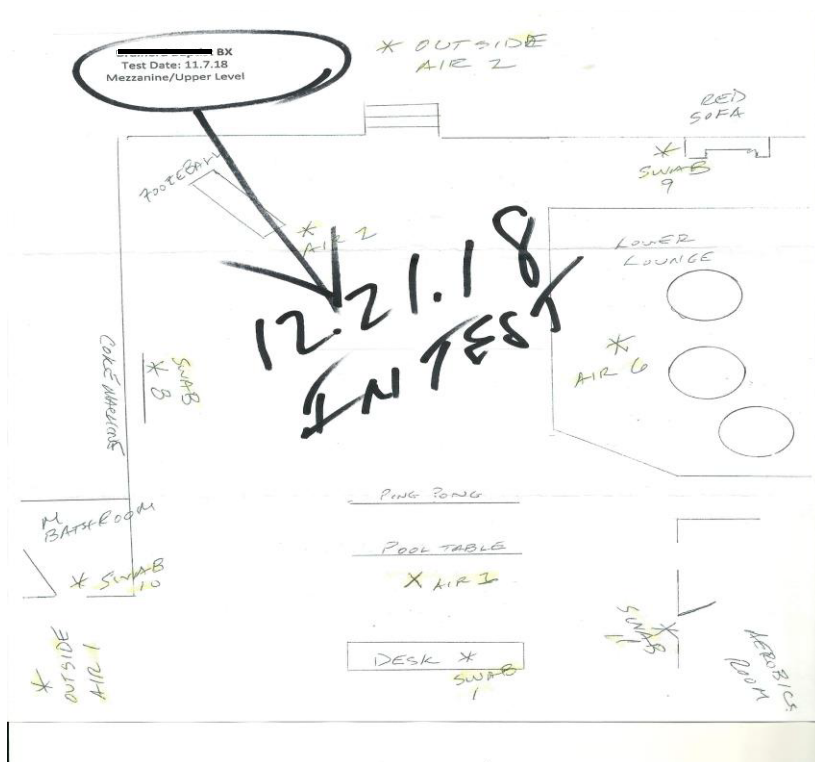




Table #4, continued
Church
Pre-treatment Air Sample Location Map

11/07/18 Pre-treatment

