Scientific Air Solutions

December 26, 2017

PhoenixAire
1100 North Glebe Road, Suite 600
Arlington VA 22201

Pre and In-Treatment Air and Surface Report – [redacted]

A. Summary – Air Samples

Pre and In-treatment air samples results given below.

Sample Date	Treatment	Number of samples	Location	Average (cfu/m^3)	Range	Standard Deviation	Percent Difference
11/07/17	Pre	24	Gym	1,074	900/1,367	86.8	-
12/14/17	**In**			**15**	**0/67**	**7.6**	**98.6**
11/07/17	Pre	2	Men's Locker Room	1,567	1,467/1,667	50.0	-
12/14/17	**In**			**17**	**0/33**	**8.3**	**98.9**
11/07/17	Pre	3	Exterior	3,422	3,267/3,567	122.7	-
12/14/17	**In**			**2,000**	**1,767/2,233**	**190.5**	**41.6**

Background
All air samples were taken via the MB-2 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^3).

Noted below is a review of various airborne organisms found in the two locations shown above, not including the exterior, during **pre-treatment** sampling.

Species	Raw Count	Species	Raw Count
Penicillium, aspergillus types	10,152	*Penicillium brevicompactum*	3,795
Aspergillus fumigatus	8,952	*Mortierella, spp*	1,266
Cladosporium sphaerospermum	7,679	*Basidiospores spp*	985
Penicillium purpurogenum	5,513	*Stachybotrys chartarum (atra)*	825

Given below is the various types of airborne organisms found in the given locations, not including the exterior, during **in-treatment** sampling.

Species	Raw Count	Species	Raw Count
Penicillium, aspergillus types	290	*Penicillium brevicompactum*	< 5
Aspergillus fumigatus	110	*Mortierella, spp*	< 5
Cladosporium sphaerospermum	< 5	*Basidiospores spp*	< 5
Penicillium purpurogenum	< 5	*Stachybotrys chartarum (atra)*	< 5

Pre-treatment bioburden in the above rooms are **> 300 cfu/m^3** which is **not acceptable** and needs corrective action.

In-treatment bioburden was **reduced 98.6%** and **98.9%** respectively, in the above locations and are now < 100 cfu/m^3 which is considered **clean and acceptable**

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Observations
Outside air samples ranged from **1,767** to **2,233 cfu/m^3** which is somewhat lower that the pre-treatment samples. However, this still shows that a significant amount of the bioburden is coming from the outside air. These results now show that even with the high counts the airPHX units are able to significantly reduce the bioburden.

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

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

In most cases, air quality < 100 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	Treatment	Number of samples	Location	Average (cfu/cm^2)	Range	Standard Deviation	Percent Difference
11/07/17	Pre	9	Various	22	10/45	10.2	-
12/14/17	**In**			**0.1**	**0.0/0.1**	**0.02**	**99.6**
11/07/17	Pre	1	Negative control	0	0/0	-	-
12/14/17	**In**			**0**	**0/0**	-	-

Pre-treatment contact swab results in all the various locations are > 10 cfu/cm^2 which is not acceptable and needs corrective action.

In-treatment contact swab results revealed a **99.6% reduction** in all the locations and are now < 5 cfu/cm^2 which is considered **clean and acceptable**

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

- < 45 cfu total or < 1.67-log, or < 5 cfu/cm^2 is considered **clean and acceptable**.
- 140 to 260 cfu total or 2.15 to 2.41-log, or 5 to 10 cfu/cm^2 is considered **marginal**.
- > 260 cfu total or > 2.41-log, or > 10 cfu/cm^2 is considered **not acceptable** and needs corrective action.

In most cases, air quality < 45 cfu total or < 5 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

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Table #1

[redacted]

12/14/17 In-treatment Air Sample Results - CFU/m^3

[redacted]			In-treatment 12/14/17			
Plate Lot No.	Air Sample Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m3
3282	Ctrl	Unopened	30	0	0	0
3486	B2	1	30	0	0	0
3490	B2	2	30	0	0	0
3494	B2	3	30	0	0	0
3498	B2	4	30	1	1	33
3502	B2	5	30	0	0	0
3506	B2	6	30	1	1	33
3510	B2	7	30	1	1	33
3514	B2	8	30	1	1	33
3518	B2	9	30	0	0	0
1909	B2	10	30	0	0	0
1908	B2	11	30	0	0	0
1907	B2	12	30	1	1	33
1906	B2	13	30	1	1	33
1905	B2	14	30	1	1	33
1904	B2	15	30	0	0	0
1903	B2	16	30	0	0	0
1902	B2	17	30	0	0	0
1901	B2	18	30	0	0	0
1900	B2	19	30	1	1	33
1510	B2	20	30	1	1	33
1509	B2	21	30	0	0	0
1508	B2	22	30	0	0	0
1507	B2	23	30	0	0	0
1506	B2	24	30	2	2	67
1505	B2	25	30	1	1	33
1504	B2	26	30	0	0	0
1503	B2	EXT 1	30	56	60	2,000
1502	B2	EXT 2	30	49	53	1,767
1501	B2	EXT 3	30	53	67	2,233

Gym samples

Avg	15	High	67
Low	0	SD	7.6

Men's Locker Room

Avg	17	High	33
Low	0	SD	8.3

Avg	2,000
Low	1,767
High	2,233
SD	190.5

Total Adjusted Raw Count	192
Total CFU/m3	400

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Table #2

[redacted]

12/14/17 In-treatment Surface Sample Results – CFU/cm^2

[redacted]			In-treatment 12/14/17							
Room	Swab Number	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm2					
N/A	CTRL	Control swab	0	0	0					
B2	1	Mat, corner near weights	10x10x10	8	0.1					
B2	2	35# dumbell	10x10x10	5	0.1					
B2	3	Treadmill, 2nd row 4th in, left hand rail	10x10x10	5	0.1					
B2	4	Bike, back	10x10x10	5	0.1					
B2	5	Desktop, front desk	10x10x10	1	0.0					
B2	6	Door, men's locker #121	10x10x10	4	0.0					
B2	7	Floor, under corner bar	10x10x10	5	0.1					
B2	8	Leg press, back	10x10x10	10	0.1	Avg	0.1	Max	0.1	
B2	9	Floor, front of mens room	10x10x10	6	0.1	Min	0.0	SD	0.02	

Total Adjusted Raw Count	49
Total CFU/cm2	0

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Table #3

[redacted]

Air Sample Pictures

12/14/17 In-treatment

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Table #3, continued

[redacted]

Air Sample Pictures

11/07/17 Pre-treatment

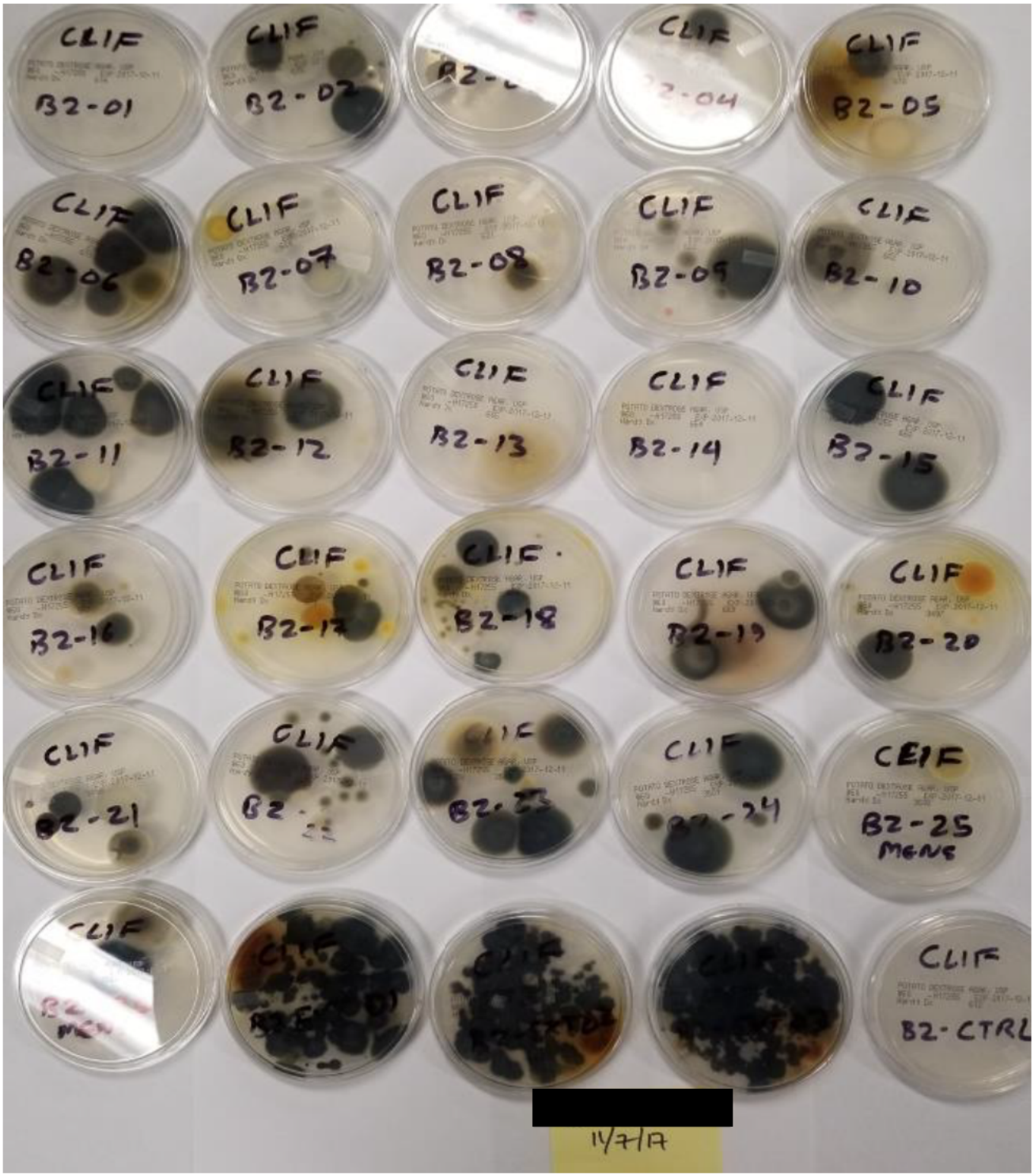

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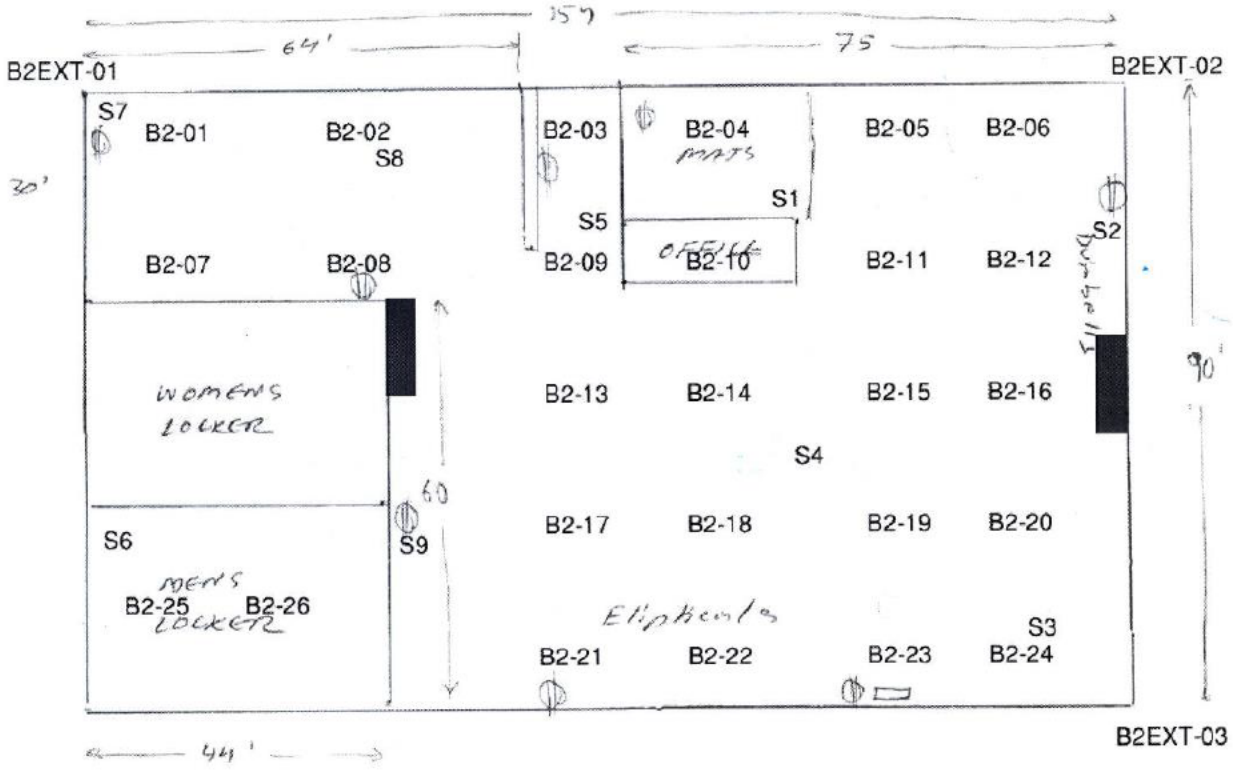
Table #4

[redacted]

Air Sample Location Map



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