



airPHX Companies  
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March 16, 2020

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

### A. Summary – Air Samples

Pre-treatment and new in-treatment air samples results given below.

Sample Date	Treatment	Number of samples	Location	Average (cfu/m <sup>3</sup> )	Range	Standard Deviation	% Reduction
09/27/2019	Pre	11	ATR	427	267/633	104.3	-
02/29/2020	In			<b>9</b>	<b>0/33</b>	<b>14.8</b>	<b>97.9</b>
09/27/2019	Pre	2	Hallway	667	633/700	33.3	-
02/29/2020	In			<b>33</b>	<b>0/67</b>	<b>33.3</b>	<b>95.1</b>
09/27/2019	Pre	2	Hydro	483	400/567	83.3	-
02/29/2020	In	4		<b>8</b>	<b>0/33</b>	<b>14.4</b>	<b>98.3</b>
09/27/2019	Pre	2	Exterior	2,167	2,100/2,233	66.7	-
02/29/2020	In	4		<b>1,850</b>	<b>1,767/1,933</b>	<b>68.7</b>	<b>14.6</b>

Extended “Halo” area testing, 02/29/2020 in-treatment only.

Sample Date	Treatment	Number of samples	Location	Average (cfu/m <sup>3</sup> )	Range	Standard Deviation
02/29/2020	In	6	Weight Room	17	0/33	16.7
		4	Locker Room	8	0/33	16.7
		4	Nutrition	42	33/67	14.4
		2	Meeting, Defensive Line	17	0/33	16.7
		2	Meeting, Defensive Backs	67	67/67	0.0
		6	Hallway	39	0/133	44.8

### 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 airborne organisms found in the above locations for this 09/27/2019 **pre-treatment** sampling, excluding the outside samples.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	2,150	<i>Cladosporium sphaerospermum</i>	675
<i>Penicillium brevicompactum</i>	1,350	<i>Ulocladium chartarum</i>	525
<i>Aspergillus fumigatus</i>	895	<i>Absidia spp</i>	410
<i>Penicillium purpurogenum</i>	775	<i>Firmicutes spp</i>	220

Noted below are airborne organisms found in the above locations for this 02/29/2020 **in-treatment** sampling, excluding the outside samples.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	135	<i>Cladosporium sphaerospermum</i>	< 5
<i>Penicillium brevicompactum</i>	65	<i>Ulocladium chartarum</i>	< 5
<i>Aspergillus fumigatus</i>	< 5	<i>Absidia spp</i>	< 5
<i>Penicillium purpurogenum</i>	< 5	<i>Firmicutes spp</i>	< 5



09/27/2019 – Pre-treatment bioburden in the above locations are  $> 300 \text{ cfu/m}^3$  which is not acceptable and needs corrective action.

**02/29/2020 - In-treatment** results for the ATR show a **97.9% decrease** from the pre-treatment samples and now are  $< 100 \text{ cfu/m}^3$  which is considered **clean and acceptable**.

- The **Hallway** area which is out of the direct airPHX treatment area has seen the “halo effect” from the treatment area and is showing a **95.1% reduction** from the pre-treatment samples.
- The **Hydro** area is further secluded and yields a **98.3% reduction** also seeing a “halo effect” from the treatment area.

## Observations

The exterior air samples ranged from **1,767 to 2,167  $\text{cfu/m}^3$**  and reveals that most of the bioburden is attributed to the outside air. The airPHX unit is having a noticeable impact on reducing the bioburden.

## 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  $300 \text{ cfu/m}^3$  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.

## 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

Previous in-treatment and new in-treatment surface (swab) samples results given below.

Sample Date	Treatment	Number of samples	Location	Average ( $\text{cfu/cm}^2$ )	Range	Standard Deviation	% Reduction
09/27/2019	Pre	10	Various	56.2	29.0/125.0	33.0	-
02/29/2020	In	9		<b>1.3</b>	<b>0.8/2.1</b>	<b>0.5</b>	<b>97.7</b>
09/27/2019	Pre	1	Negative Control	0	0/0	-	-
02/29/2020	In			0	0/0	-	-

09/27/2019 – Pre-treatment contact swab results from the various locations were considerably  $> 10 \text{ cfu/cm}^2$  which is considered **not acceptable** and needs corrective action.

**02/29/2020 - In-treatment** contact swab results reveal a further **97.7% reduction** from the previous-treatment samples from the same locations and are  $< 5 \text{ cfu/cm}^2$  considered **clean and acceptable**.



## Target Contact Surface Quality

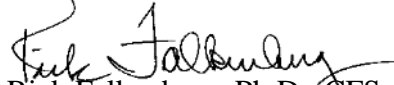
Contact surface quality scale for workplaces, public buildings, schools, and homes are as follows:

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

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

  
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Senior Principal Scientist

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Table #1  
University of [REDACTED] – Athletic Training  
02/29/2020 In-treatment Air Sample Results - CFU/m<sup>3</sup>

In-treatment 02/29/2020 - U of [REDACTED] - Athletic Training						
Plate Lot No.	Air Sample Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m <sup>3</sup>
1312	Ctrl	Unopened	0	0	0	0
1359	1	ATR	30	0	0	0
1313	2	ATR	30	0	0	0
1314	3	ATR	30	1	1	33
1315	4	ATR	30	1	1	33
1316	5	ATR	30	0	0	0
1317	6	ATR	30	1	1	33
1318	7	ATR	30	0	0	0
1319	8	ATR	30	0	0	0
1320	9	ATR	30	0	0	0
1373	10	ATR	30	0	0	0
1365	11	ATR	30	0	0	0
1381	12	Hallway	30	0	0	0
1405	12A	Hallway	30	2	2	67
1389	13	Hydro - ATR	30	0	0	0
1397	14	Hydro - ATR	30	0	0	0
1360	14B	Hydro - ATR	30	0	0	0
1356	14C	Hydro - ATR	30	1	1	33
2209	1	Exterior	30	48	54	1,800
2201	2	Exterior	30	51	58	1,933
2193	3	Exterior	30	47	53	1,767
2185	4	Exterior	30	50	57	1,900

Avg	9	High	33
Low	0	SD	14.8
Avg	33	High	67
Low	0	SD	33.3

Avg	8	High	33
Low	0	SD	14.4

Avg	1,850	High	1,933
Low	1,767	SD	68.7

Total Adjusted Raw Count	5
Total CFU/m <sup>3</sup>	200

Table #1, continued  
University of [REDACTED] – Athletic Training  
09/27/2019 Pre-treatment Air Sample Results - CFU/m<sup>3</sup>

Pre-treatment 09/27/2019 - U of [REDACTED] - Athletic Training						
Plate Lot No.	Air Sample Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m <sup>3</sup>
409	Ctrl	Unopened	0	0	0	0
405	1	ATR	30	10	10	333
401	2	ATR	30	12	12	400
397	3	ATR	30	16	17	567
393	4	ATR	30	12	12	400
389	5	ATR	30	13	13	433
385	6	ATR	30	12	12	400
381	7	ATR	30	10	10	333
377	8	ATR	30	8	8	267
3237	9	ATR	30	12	12	400
3238	10	ATR	30	18	19	633
3239	11	ATR	30	15	16	533
3240	12	Hallway	30	20	21	700
3236	12B	Hallway	30	18	19	633
373	13	Hydro	30	12	12	400
3234	14	Hydro	30	16	17	567
3241	1	Exterior	30	55	63	2,100
3235	2	Exterior	30	58	67	2,233

Avg	427	High	633
Low	267	SD	104.3
Avg	667	High	700
Low	633	SD	33.3
Avg	483	High	567
Low	400	SD	83.3

Avg	2,167	High	2,233
Low	2,100	SD	66.7

Total Adjusted Raw Count	181
Total CFU/m <sup>3</sup>	7,000



Table #2

**University of [REDACTED] – Athletic Training**  
02/29/2020 In-treatment Surface Sample Results – CFU/cm<sup>2</sup>

In-treatment 02/29/2020 - U of [REDACTED] - Athletic Training					
Room	Swab Number	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm <sup>2</sup>
N/A	CTRL	Swab not removed from container	0	0	0
Surface	1	End training rail	10x10x10	75	0.8
Surface	2	Rower back end/padded	10x10x10	205	2.1
Surface	3	Dyantron face, station #8	10x10x10	90	0.9
Surface	4	Check-in counter	10x10x10	85	0.9
Surface	5	Hydro door handle/face of door	10x10x10	105	1.1
Surface	6	Floor leading into hydro room (hard floor)	10x10x10	175	1.8
Surface	7	Table in ortho room	10x10x10	85	0.9
Surface	8	Keyboard and mouse, and handle in [REDACTED] office	10x10x10	195	2.0
Surface	9	Handrail in Hydro - New	10x10x10	125	1.3

Avg

1.3

Max

2.1

Min

0.8

SD

0.48

Total Adjusted Raw Count 1,140

Total CFU/cm<sup>2</sup> 11

Table #2, continued

**University of [REDACTED] – Athletic Training**  
09/27/2019 Pre-treatment Surface Sample Results – CFU/cm<sup>2</sup>

Pre-treatment 09/27/2019 - U of [REDACTED] - Athletic Training					
Room	Swab Number	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm <sup>2</sup>
N/A	CTRL	Swab not removed from container	0	0	0
Surface	1	End training rail	10x10x10	3,500	35.0
Surface	2	Rower back end	10x10x10	7,500	75.0
Surface	3	Dyantron face, station #8	10x10x10	3,650	36.5
Surface	4	Check-in counter	10x10x10	3,410	34.1
Surface	5	Hydro door handle/face of door	10x10x10	2,900	29.0
Surface	6	Floor leading into hydro room	10x10x10	2,950	29.5
Surface	7	Table in ortho room	10x10x10	8,520	85.2
Surface	8	Keyboard and handle in [REDACTED] office	10x10x10	12,500	125.0

Avg

56.2

Max

125.0

Min

29.0

SD

32.99

Total Adjusted Raw Count 44,930

Total CFU/cm<sup>2</sup> 449





Table #3  
University of [REDACTED] – Athletic Training  
02/29/2020- In-treatment Air Sample Pictures

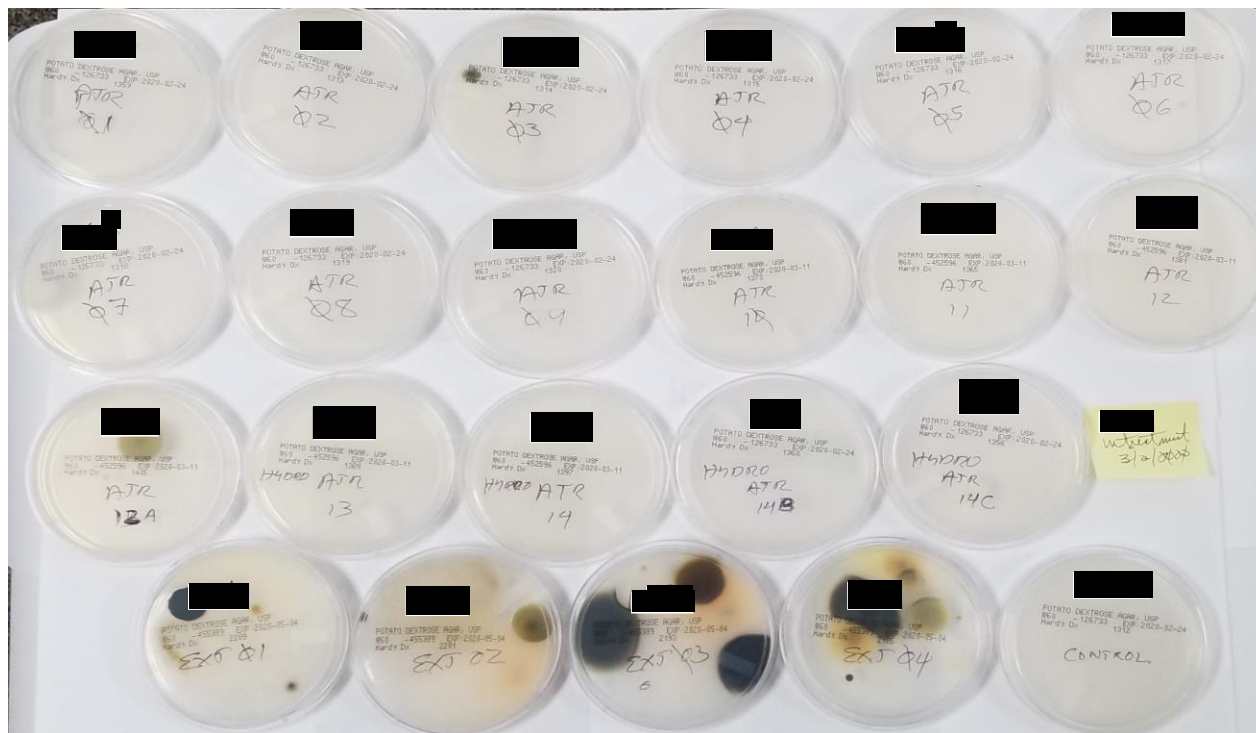


Table #3, continued  
University of [REDACTED] – Athletic Training  
09/27/2019- Pre-treatment Air Sample Pictures

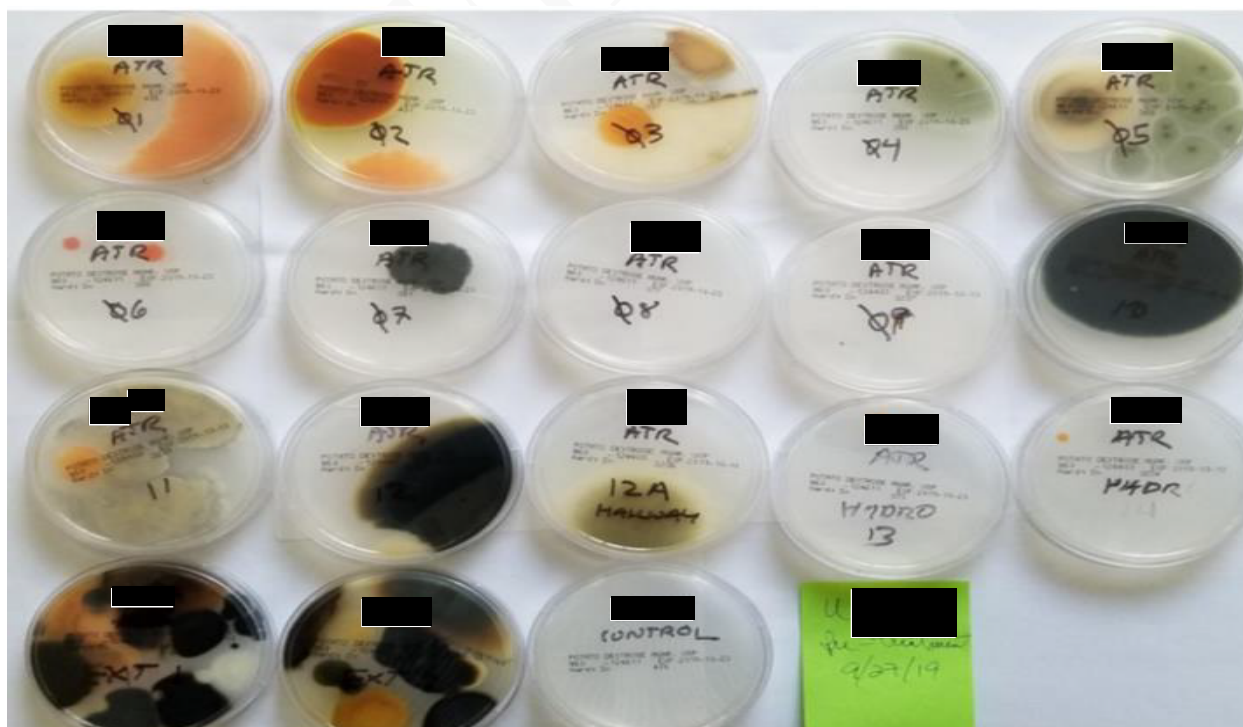




Table #4

## University of [REDACTED] - Athletic Training

02/29/2020 - In-treatment and 09/27/2019 Pre-treatment Air/Surface Swab Locations

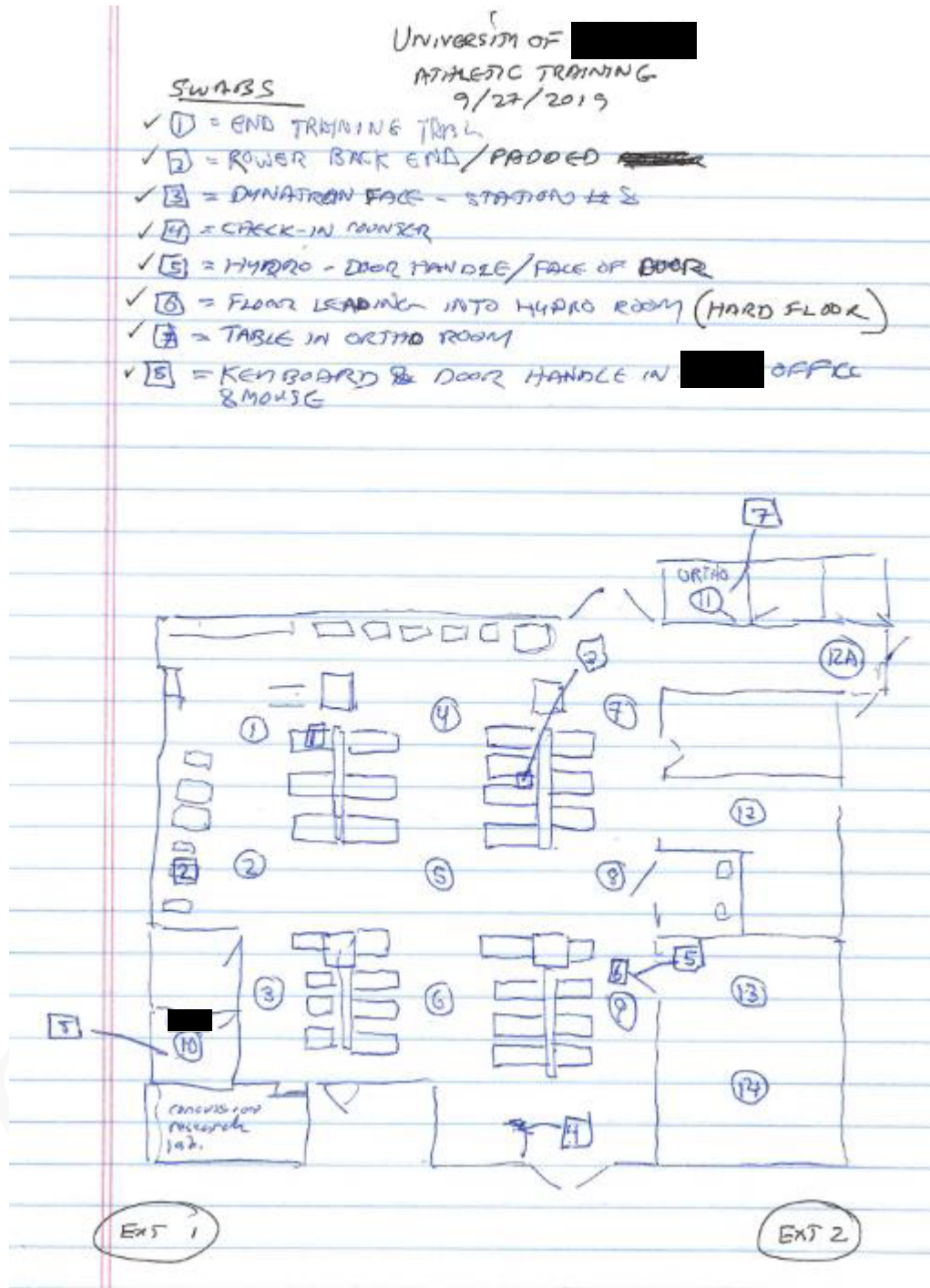




Table #4, continued  
**University of [REDACTED] – Athletic Training**  
 02/29/2020 - In-treatment "Halo" Area - Air Sampling Locations

