



airPHX Companies
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McLean, VA 22101

November 30, 2019

Pre and In-Treatment Air and Surface Report – Seymour High School

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 Reduction
10/22/19	Pre	2	Office Equipment Storage	1,850	1,800/1,900	50.0	-
11/20/19	In			117	100/133	16.7	93.7
10/22/19	Pre	2	Locker Room Changing/Shower	2,817	2,767/2,867	50.0	-
11/20/19	In			133	100/167	33.3	95.3
10/22/19	Pre	3	Wrestling area North, Middle, South	1,687	1,433/1,933	204.3	-
11/20/19	In			100	67/133	27.2	94.1
10/22/19	Pre	1	Exterior	1,667	1,667/1,667	0.0	-
11/20/19	In			1,600	1,600/1,600	0.0	4.0

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 airborne organisms found in the above locations for this **pre-treatment** sampling, excluding the outside samples.

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	4,525	<i>Penicillium purpurogenum</i>	945
<i>Aspergillus fumigatus</i>	3,475	<i>Basidiospores spp</i>	835
<i>Penicillium purpurogenum</i>	2,112	<i>Absidia, spp</i>	620
<i>Cladosporium sphaerospermum</i>	1,350	<i>Mortierella, spp</i>	505

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

Species	Raw Count	Species	Raw Count
<i>Penicillium, aspergillus types</i>	310	<i>Penicillium purpurogenum</i>	< 5
<i>Aspergillus fumigatus</i>	267	<i>Firmicutes spp</i>	< 5
<i>Penicillium brevicompactum</i>	145	<i>Absidia spp</i>	< 5
<i>Penicillium purpurogenum</i>	78	<i>Ulocladium chartarum</i>	< 5

10/22/19 - Pre-treatment bioburden in the above locations are considerably > 300 cfu/m³ which is not acceptable and needs corrective action.

11/20/19 - **In-treatment** results show a **decrease** in bioburden in all locations sampled.

- **Wrestling area, north, middle and south** yielded a **94.1% decrease** and now are ≤ 100 cfu/m³ which is considered **clean and acceptable**, per the Target Air Quality Guide.
- **The Locker room and Office/Equipment storage** areas which are out of direct airPHX treatment, have seen the “halo effect” from the treatment area showing **95.3%** and **93.7% reduction** respectively. Both of these sites are now 100 to 300 cfu/m³ which is **marginal** and continued airPHX treatment will further decrease these counts.

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Observations

The exterior air samples ranged from **2,667** to **2,900 cfu/m³** and reveals that most of the bioburden is attributed to the outside air. The airPHX units are 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 cfu/m³ is considered **clean and acceptable**.
- 100 to 300 cfu/m³ is **marginal**.
- > 300 cfu/m³ is **not acceptable** and needs corrective action.

In most cases, air quality < **100 cfu/m³** 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	Treatment	Number of samples	Location	Average (cfu/cm ²)	Range	Standard Deviation	% Reduction
10/22/19	Pre	7	Various	84.7	65/107.5	12.3	-
11/20/19	In			4.1	3.2/5.3	0.7	95.2
10/22/19	Pre	1	Neg. Control	0	0/0	-	-
11/20/19	In			0	0/0	-	-

10/22/19 - Pre-treatment contact swab results from the various locations are sizeably > 5 cfu/cm² which is considered not acceptable and needs corrective action.

11/20/19 - In-treatment results show a **95.2% reduction** from the various locations are now < 5 cfu/cm² and considered **clean and acceptable**, per the Target Contact Swab Quality guide.

Target Contact Surface Quality

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

- < 5 cfu/cm² is considered **clean and acceptable**.
- 5 to 10 cfu/cm² is considered **marginal**.
- > 10 cfu/cm² is considered **not acceptable** and needs corrective action.

In most cases, surface swabs < **5 cfu/cm²** 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,

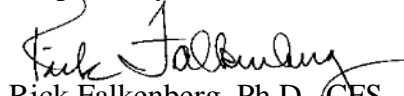

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Senior Principal Scientist



Table #1
Seymour High School
 11/20/19 In-treatment Air Sample Results - CFU/m³

In-treatment 11/20/2019 - Seymore High School						
Plate Lot No.	Air Sample Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m3
780	Ctrl	Unopened	0	0	0	0
785	1	Office	30	3	3	100
789	2	Equipment storage	30	4	4	133
793	3	Locker room, shower area	30	5	5	167
797	4	Locker room, changing area	30	3	3	100
801	5	Wrestling area, south end	30	2	2	67
809	6	Wrestling area, middle end	30	3	3	100
805	7	Wrestling area, north end	30	4	4	133
781	8	Outside	30	43	48	1,600

Avg	117	High	133
Low	100	SD	16.7
Avg	133	High	167
Low	100	SD	33.3
Avg	100	High	133
Low	67	SD	27.2
Avg	1,600	High	1,600
Low	1,600	SD	733.3

Total Adjusted Raw Count 72
 Total CFU/m3 800

Table #1, continue
Seymour High School
 10/22/19 Pre-treatment Air Sample Results - CFU/m³

Pre-treatment 10/22/2019 - Seymore High School						
Plate Lot No.	Air Sample Location	Air Sample Location	Liters of Air	Raw Count	Corrected Count	CFU/m3
780	Ctrl	Unopened	0	0	0	0
785	1	Office	30	50	57	1,900
789	2	Equipment storage	30	48	54	1,800
793	3	Locker room, shower area	30	69	83	2,767
797	4	Locker room, changing area	30	71	86	2,867
801	5	Wrestling area, south end	30	39	43	1,433
809	6	Wrestling area, middle end	30	45	50	1,667
805	7	Wrestling area, north end	30	51	58	1,933
781	8	Outside	30	45	50	1,667

Avg	1,850	High	1,900
Low	1,800	SD	50.0
Avg	2,817	High	2,867
Low	2,767	SD	50.0
Avg	1,678	High	1,933
Low	1,433	SD	204.3
Avg	1,667	High	1,667
Low	1,667	SD	133.3

Total Adjusted Raw Count 481
 Total CFU/m3 14,367



Table #2
Seymour High School
 11/20/19 In-treatment Surface Sample Results – CFU/cm²

In-treatment 11/20/2019 - Seymore High School					
Room	Swab Number	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm ²
N/A	CTRL	Swab not removed from container	0	0	0
Surface	1	Office, computer keyboard, door handle, desktop, chair	10x10x10	410	4.1
Surface	2	Equipment storage, shoes, face mask, door handle, coke machine	10x10x10	450	4.5
Surface	3	Locker room, shower handle, curtain, floor sinktop and handle, urnal handle	10x10x10	525	5.3
Surface	4	Locker room, lockers, washer, and dryer handles, floor, shoes	10x10x10	475	4.8
Surface	5	Wrestling room, 45f x 90f mat, wall mats, south end area	10x10x10	350	3.5
Surface	6	Wrestling room, middle mat area, wall mats	10x10x10	365	3.7
Surface	7	Wrestling Room, North end, mat-floor, wall mat	10x10x10	320	3.2

Avg 4.1 Max 5.3
 Min 3.2 SD 0.68

Total Adjusted Raw Count 2,895
 Total CFU/cm² 29

Table #2, continued
Seymour High School
 10/22/19 Pre-treatment Surface Sample Results – CFU/cm²

Pre-treatment 10/22/2019 - Seymore High School					
Room	Swab Number	Surface Swab Sample Location	10x10x10 cm	Raw Count	CFU/cm ²
N/A	CTRL	Swab not removed from container	0	0	0
Surface	1	Office, computer keyboard, door handle, desktop, chair	10x10x10	8,500	85.0
Surface	2	Equipment storage, shoes, face mask, door handle, coke machine	10x10x10	9,300	93.0
Surface	3	Locker room, shower handle, curtain, floor sinktop and handle, urnal handle	10x10x10	10,750	107.5
Surface	4	Locker room, lockers, washer, and dryer handles, floor, shoes	10x10x10	7,950	79.5
Surface	5	Wrestling room, 45f x 90f mat, wall mats, south end area	10x10x10	6,500	65.0
Surface	6	Wrestling room, middle mat area, wall mats	10x10x10	8,600	86.0
Surface	7	Wrestling Room, North end, mat-floor, wall mat	10x10x10	7,700	77.0

Avg 84.7 Max 107.5
 Min 65.0 SD 12.33

Total Adjusted Raw Count 59,300
 Total CFU/cm² 593



Table #3
Seymour High School
11/20/2019 In-treatment Air Sample Pictures



Table #3, continued
Seymour High School
10/22/2019 Pre-treatment Air Sample Pictures



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Table #4
Seymour High School
11/20/19 and 10/22/19 Pre and in-treatment Air and Surface Swab Locations

