



CAMPLIN

Environmental Services, Inc.

September 9, 2018

Highland Middle School - Libertyville School District 70
310 W. Rockland Road
Libertyville, IL 60048

Attention: Peadar Hurley, Supervisor of Maintenance and Facilities

Subject: Mold Evaluation and Testing
Highland Middle School

Dear Peadar,

On September 20th, 2022, Jeffery Camplin, Senior Consultant for Camplin Environmental Services, Inc. (CESI) was contracted to evaluate potential mold concerns in a few classrooms at Highland Middle School. The evaluation involved air testing in the building. Air testing was performed using “spore trap” air monitoring. This method collects non-viable airborne fungal spores. A total of four (4) air samples were collected. One sample each was obtained from rooms 129 and 137. An additional indoor sample was obtained in the corridor near room 133. A final sample was obtained from outdoor air for statistical comparison purposes.

Additional air testing was performed to evaluate temperature, humidity, carbon monoxide, carbon dioxide, total VOCs, and particulate matter. Readings were taken prior to the start of school and after school was let out. A cursory review of the ventilation system was also performed.

Findings/Recommendations

Air testing did not find an apparent current problem with mold in the indoor air. However, there has been a chronic humidity problem in the west end of the building for several years. There appear to be multiple sources that contribute to the elevated humidity and associated condensation.

- No mold spores were detected in the room 137. Very low mold spores (similar to but lower than outdoor air) were detected in the corridor and room 129. Air testing did not find any apparent current mold related issues associated with indoor air.
- Air monitoring testing found that carbon dioxide was significantly elevated (>1,800 parts per million) 15 minutes after school ended than it was in the morning (600 ppm). It is expected that carbon dioxide levels will rise as the building is occupied. However, elevated levels above 1,000 parts per million are an indicator of poor air exchanges from the ventilation system in the building.
- The west side of the building had high humidity on the day of testing (>60%). Condensation associated with the high humidity is a chronic problem in this

section of the building. High humidity and the presence of wet surfaces from condensation should be addressed to minimize the potential for future mold growth.

- The unit ventilators are older and were retrofitted in-house back in 2018 to address high humidity identified in a previous study. However, the unit ventilators cannot be properly serviced now due to a lack of documentation on the retrofits to the equipment. The classroom unit ventilators should be upgraded to provide more effective control of humidity.
- The HVAC system resets itself any time the internet is interrupted without notification to the maintenance staff. The reset impacts any adjustments that were made to the HVAC system to address humidity at a given time. The HVAC system software should be upgraded to address the accidental resetting of the system when the internet is interrupted.
- Due to COVID protocols the building is bringing in as much outside air as possible. This contributes to the problem when humidity is high outdoors. Consider reducing the amount of outside air that is brought into the building on high humidity day.

High humidity has been a concern in the west end of the building for several years. Minor adjustments have been made by the maintenance staff to address these issues. However, it appears that a thorough evaluation of the mechanical system is warranted to formulate a more permanent solution to the high humidity in the west side of the building.

The laboratory results from the air testing are attached for your information. Please contact my office with any questions.

Cordially,



Jeffery Camplin, CSP, CPEA, CET
President

Laboratory Results



EMLab P&K

Report for:

Mr. Jeffrey Camplin
Camplin Environmental
9575 W. Higgins Rd.
Suite 450
Rosemont, IL 60018

Regarding: Project: Highland; Classrooms
EML ID: 3037007

Approved by:



Cluster Leader
Dr. Kamash Pillai

Dates of Analysis:
Spore trap analysis: 09-22-2022

Service SOPs: Spore trap analysis (EM-MY-S-1038)
AIHA-LAP, LLC accredited service, Lab ID #176641

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested. Information supplied by the client which can affect the validity of results: sample air volume.

Eurofins EMLab P&K ("the Company") shall have no liability to the client or the client's customer with respect to decisions or recommendations made, actions taken or courses of conduct implemented by either the client or the client's customer as a result of or based upon the Test Results. In no event shall the Company be liable to the client with respect to the Test Results except for the Company's own willful misconduct or gross negligence nor shall the Company be liable for incidental or consequential damages or lost profits or revenues to the fullest extent such liability may be disclaimed by law, even if the Company has been advised of the possibility of such damages, lost profits or lost revenues. In no event shall the Company's liability with respect to the Test Results exceed the amount paid to the Company by the client therefor.

Eurofins EMLab P&K's LabServe® reporting system includes automated fail-safes to ensure that all AIHA-LAP, LLC quality requirements are met and notifications are added to reports when any quality steps remain pending.

Client: Camplin Environmental
C/O: Mr. Jeffrey Camplin
Re: Highland; ClassroomsDate of Sampling: 09-20-2022
Date of Receipt: 09-21-2022
Date of Report: 09-23-2022**SPORE TRAP REPORT: NON-VIABLE METHODOLOGY**

Location:	33261246: Room 137		33261238: Corridor by Room 133		33261244: Room 129		33269173: Outdoors	
Comments (see below)	None		None		None		None	
Lab ID-Version‡:	14636795-1		14636796-1		14636797-1		14636798-1	
Analysis Date:	09/22/2022		09/22/2022		09/22/2022		09/22/2022	
	raw ct.	spores/m ³	raw ct.	spores/m ³	raw ct.	spores/m ³	raw ct.	spores/m ³
Ascospores			1	53			1	53
Basidiospores			1	53	2	110	30	1,600
Botrytis								
Chaetomium								
Cladosporium							2	110
Curvularia								
Epicoccum			1	13				
Fusarium								
Myrothecium								
Nigrospora								
Other colorless								
Penicillium/Aspergillus types†								
Pithomyces								
Rusts								
Smuts, Periconia, Myxomycetes								
Stachybotrys								
Stemphylium								
Torula								
Ulocladium								
Zygomycetes								
Background debris (1-4+)††	2+		2+		1+		3+	
Hyphal fragments/m ³	< 13		< 13		< 13		< 13	
Pollen/m ³	< 13		< 13		< 13		< 13	
Skin cells (1-4+)	< 1+		< 1+		< 1+		< 1+	
Sample volume (liters)	75		75		75		75	
§ TOTAL SPORES/m³		< 13		120		110		1,800

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.

† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium*, *Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.

†† Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher than reported. It is important to account for samples volumes when evaluating dust levels.

The analytical sensitivity is the spores/m³ divided by the raw count, expressed in spores/m³, per spore and per sample.

For more information regarding analytical sensitivity, please contact QA by calling the laboratory.

‡ A "Version" indicated by "-x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

§ Total Spores/m³ has been rounded to two significant figures to reflect analytical precision.

Client: Camplin Environmental
C/O: Mr. Jeffrey Camplin
Re: Highland; ClassroomsDate of Sampling: 09-20-2022
Date of Receipt: 09-21-2022
Date of Report: 09-23-2022**MoldRANGE™, Local Climate; Extended Outdoor Comparison****Outdoor Location: 33269173, Outdoors**

Fungi Identified	Outdoor data	Typical Outdoor Data for: September in Central† EMLab Regional Climate code¹ B Annual Temp, B Elev., B Rain, A Temp. Range (n‡=931)						Typical Outdoor Data for: The entire year in Central† EMLab Regional Climate code¹ B Annual Temp, B Elev., B Rain, A Temp. Range (n‡=8028)					
		very low	low	med	high	very high	freq %	very low	low	med	high	very high	freq %
Project zip code 60048	spores/m3												
Generally able to grow indoors*													
Alternaria	-	22	40	120	340	570	86	13	20	53	200	360	54
Bipolaris/Drechslera group	-	7	7	13	40	67	17	7	7	13	27	53	7
Chaetomium	-	7	9	13	27	59	4	7	7	13	20	36	3
Cladosporium	110	320	750	2,700	7,000	12,000	98	53	130	750	3,200	5,700	86
Curvularia	-	7	13	13	40	81	25	7	8	13	33	53	8
Epicoccum	-	13	27	67	200	350	75	13	13	40	120	230	45
Nigrospora	-	13	13	40	120	230	56	7	13	27	67	130	21
Penicillium/Aspergillus types	-	53	80	200	470	960	45	39	53	110	320	600	43
Stachybotrys	-	-	-	-	-	-	< 1	7	8	13	27	67	< 1
Torula	-	7	13	20	53	100	12	7	7	13	46	80	6
Seldom found growing indoors**													
Ascospores	53	160	270	750	1,800	3,300	96	53	110	480	1,700	3,400	76
Basidiospores	1,600	410	750	2,400	6,000	9,400	99	53	160	1,000	3,600	6,100	87
Rusts	-	13	27	67	200	410	74	13	13	40	120	250	30
Smuts, Periconia, Myxomycetes	-	13	27	53	170	280	71	13	13	40	120	220	50
§ TOTAL SPORES/m3	1,800												

¹EMLab Regional Climate codes are a climate classification scheme for regional geographic areas containing multiple states. The MoldRANGE™ Local Climate report uses the sampling location zip code to identify the EMLab Regional Climate code in that area. Using information available from the NOAA weather database, the EMLab Regional Climate code sharpens the precision of the MoldRANGE™ reporting system, providing more reliable estimates of the range and average concentrations of the different airborne fungal spore types for each region. Additional information on the EMLab Regional Climate code system can be found on the last page of this report.

†The Typical Outdoor Data represents the typical outdoor spore levels across the region's group of states for the time period and EMLab Regional Climate code indicated. The last column represents the frequency of occurrence. The very low, low, med, high, and very high values represent the 10, 20, 50, 80, and 90 percentile values of the spore type when it is detected. For example, if the frequency of occurrence is 63% and the low value is 53, it would mean that the given spore type is detected 63% of the time and, when detected, 20% of the time it is present in levels above the detection limit and below 53 spores/m3. These values are updated periodically and if not enough data is available to make a statistically meaningful assessment, it is indicated with a dash.

‡ n is the sample size used to calculate the MoldRANGE™ Local Climate data summarized in the table.

* The spores in this category are generally capable of growing on wet building materials in addition to growing outdoors. Building related growth is dependent upon the fungal type, moisture level, type of material, and other factors. *Cladosporium* is one of the predominant spore types worldwide and is frequently present in high numbers. *Penicillium/Aspergillus* species colonize both outdoor and indoor wet surfaces rapidly and are very easily dispersed. Other genera are usually present in lesser numbers.

** These fungi are generally not found growing on wet building materials. For example, the rusts and smuts are obligate plant pathogens. However, in each group there are notable exceptions. For example, agents of wood decay are members of the basidiomycetes and high counts of a single morphological type of basidiospore on an inside sample should be considered significant.

§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

Client: Camplin Environmental
C/O: Mr. Jeffrey Camplin
Re: Highland; Classrooms

Date of Sampling: 09-20-2022
Date of Receipt: 09-21-2022
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Understanding EMLab Regional Climate Codes

Outdoor airborne spore concentrations are strongly influenced by climate and weather patterns, often resulting in pronounced seasonal and diurnal cycles (Burge 1995). The seasonal climatic changes directly affect the growth cycle of plants, thereby influencing fungal growth, spore maturation, and release cycles. By evaluating outdoor spore concentrations across similar climatic zones rather than for the state as a whole, it is possible to provide a more representative estimate of typical outdoor spore levels and frequency of occurrence for different airborne fungal spore types in a given area.

The EMLab Regional Climate code system is a novel classification system that uses data from the NOAA - National Oceanic and Atmospheric Administration database to define unique climate zones. The following climate variables, for each regional zip code, are obtained from NOAA and assigned a letter code of A (above the regional average for that variable) or B (below the regional average for that variable):

1. Annual High Temperature
2. Elevation
3. Rainfall/Precipitation
4. Monthly Temperature Range

The result is a 4-character code assigned to each statewide zip code, referred to as the Regional Climate Code. Below are some examples of decoded Regional Climate Codes:

AAAA = Above avg. Annual High Temperature, Above avg. Elevation, Above avg. Rainfall/Precipitation, Above avg. Monthly Temperature Range
AABB = Above avg. Annual High Temperature, Above avg. Elevation, Below avg. Rainfall/Precipitation, Below avg. Monthly Temperature Range
BBAA = Below avg. Annual High Temperature, Below avg. Elevation, Above avg. Rainfall/Precipitation, Above avg. Monthly Temperature Range

The actual outdoor air sample data from matching regional climate codes in each group of states are then compiled in a manner relating typical spore concentrations and frequency of occurrence.

The data presented in this report is from the Central Region which includes the states of: IL, IN, KY, MO, OH, TN, and WV

The NOAA regional climate variables were selected by mapping data points from a subset of approximately 145,000 weather and geographic database entries to over 80,000 outdoor spore trap samples with known zip codes and assessing them using orthogonal array experimental design techniques. The results were then compared to the typical ranges of spore types found when grouping zip codes using the Koppen-Geiger climatic classification system; a commonly used climatic system that provides an objective numerical definition in terms of climatic elements such as temperature, rainfall, and other seasonal characteristics. The EMLab Regional Climate codes showed improved granularity and refinement of the zip code groupings, implying a better representation of the expected range of spore types to be found within an individual zip code.

The values on this report were calculated by obtaining the four variables listed above from the over 585 million data points of weather and geographic information available in the NOAA database, and determining the frequencies and percentile values of spore types by utilizing over 180,000 Eurofins EMLab P&K outdoor spore trap samples with known zip codes.

This report groups regional zip codes in relation to these EMLab Regional Climate codes and summarizes MoldRANGE™ data by month and year within each EMLab Regional Climate code.

References:

Burge, Harriet, A. Bioaerosols: Boca Raton: Lewis Publishers, pp. 163-171, 1995.

Interpretation of the data contained in this report is left to the client or the persons who conducted the field work. This report is provided for informational and comparative purposes only and should not be relied upon for any other purpose. "Typical outdoor data" are based on the results of the analysis of samples delivered to and analyzed by Eurofins EMLab P&K and assumptions regarding the origins of those samples. Sampling techniques, contaminants infecting samples, unrepresentative samples and other similar or dissimilar factors may affect these results. In addition, Eurofins EMLab P&K may not have received and tested a representative number of samples for every region or time period. Eurofins EMLab P&K hereby disclaims any liability for any and all direct, indirect, punitive, incidental, special or consequential damages arising out of the use or interpretation of the data contained in, or any actions taken or omitted in reliance upon, this report.

Client: Camplin Environmental
C/O: Mr. Jeffrey Camplin
Re: Highland; ClassroomsDate of Sampling: 09-20-2022
Date of Receipt: 09-21-2022
Date of Report: 09-23-2022**MoldSTAT™: Supplementary Statistical Spore Trap Report****Outdoor Summary:** 33269173: Outdoors

Species detected	Outdoor sample spores/m3				Typical outdoor ranges (North America)	Freq. %
	<100	1K	10K	>100K		
Ascospores					13 - 220 - 6,100	75
Basidiospores					13 - 440 - 25,000	89
Cladosporium					27 - 480 - 7,800	88
Penicillium/Aspergillus types					16 - 200 - 2,800	62
Smuts, Periconia, Myxomycetes					7 - 53 - 890	65
Total						

The "Typical outdoor ranges" and "Freq. %" columns show the typical low, medium, and high spore counts per cubic meter and the frequency of occurrence for the given spore type. The low, medium, and high values represent the 2.5, 50, and 97.5 percentile values when the spore type is detected. For example, if the low value is 53 and the frequency of occurrence is 63%, it would mean that we typically detect the given spore type on 63 percent of all outdoor samples and, when detected, 2.5% of the time it is present in levels below 53 spores/m3.

Indoor Samples**Location:** 33261246: Room 137

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: < 1%	dF: 2 Result: 2.6667 Critical value: 5.9915 Inside Similar: Yes	Result: 0.0000	dF: N/A Result: N/A Critical value: N/A Outside Similar: N/A	Score: 100 Result: Low
Species Detected	Spores/m3			
	<100	1K	10K	>100K
None Detected				

Location: 33261238: Corridor by Room 133

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 6%	dF: 2 Result: 2.6667 Critical value: 5.9915 Inside Similar: Yes	Result: 0.6667	dF: 4 Result: 0.2500 Critical value: N/A Outside Similar: N/A	Score: 105 Result: Low
Species Detected	Spores/m3			
	<100	1K	10K	>100K
Ascospores				
Basidiospores				
Epicoccum				
Total				

Client: Camplin Environmental
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Re: Highland; ClassroomsDate of Sampling: 09-20-2022
Date of Receipt: 09-21-2022
Date of Report: 09-23-2022**MoldSTAT™: Supplementary Statistical Spore Trap Report****Location:** 33261244: Room 129

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: 6%	dF: 2 Result: 2.6667 Critical value: 5.9915 Inside Similar: Yes	Result: 0.5000	dF: 3 Result: 0.8750 Critical value: N/A Outside Similar: N/A	Score: 102 Result: Low	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
Basidiospores					110
Total					110

* The Friedman chi-square statistic is a non-parametric test that examines variation in a set of data (in this case, all indoor spore counts). The null hypothesis (H0) being tested is that there is no meaningful difference in the data for all indoor locations. The alternative hypothesis (used if the test disproves the null hypothesis) is that there is a difference between the indoor locations. The null hypothesis is rejected when the result of the test is greater than the critical value. The critical value that is displayed is based on the degrees of freedom (dF) of the test and a significance level of 0.05.

** An agreement ratio is a simple method for assessing the similarity of two samples (in this case the indoor sample and the outdoor summary) based on the spore types present. A score of one indicates that the types detected in one location are the same as that in the other. A score of zero indicates that none of the types detected indoors are present outdoors. Typically, an agreement of 0.8 or higher is considered high.

*** The Spearman rank correlation is a non-parametric test that examines correlation between two sets of data (in this case the indoor location and the outdoor summary). The null hypothesis (H0) being tested is that the indoor and outdoor samples are unrelated. The alternative hypothesis (used if the test disproves the null hypothesis) is that the samples are similar. The null hypothesis is rejected when the result of the test is greater than the critical value. The critical value that is displayed is based on the degrees of freedom (dF) of the test and a significance level of 0.05.

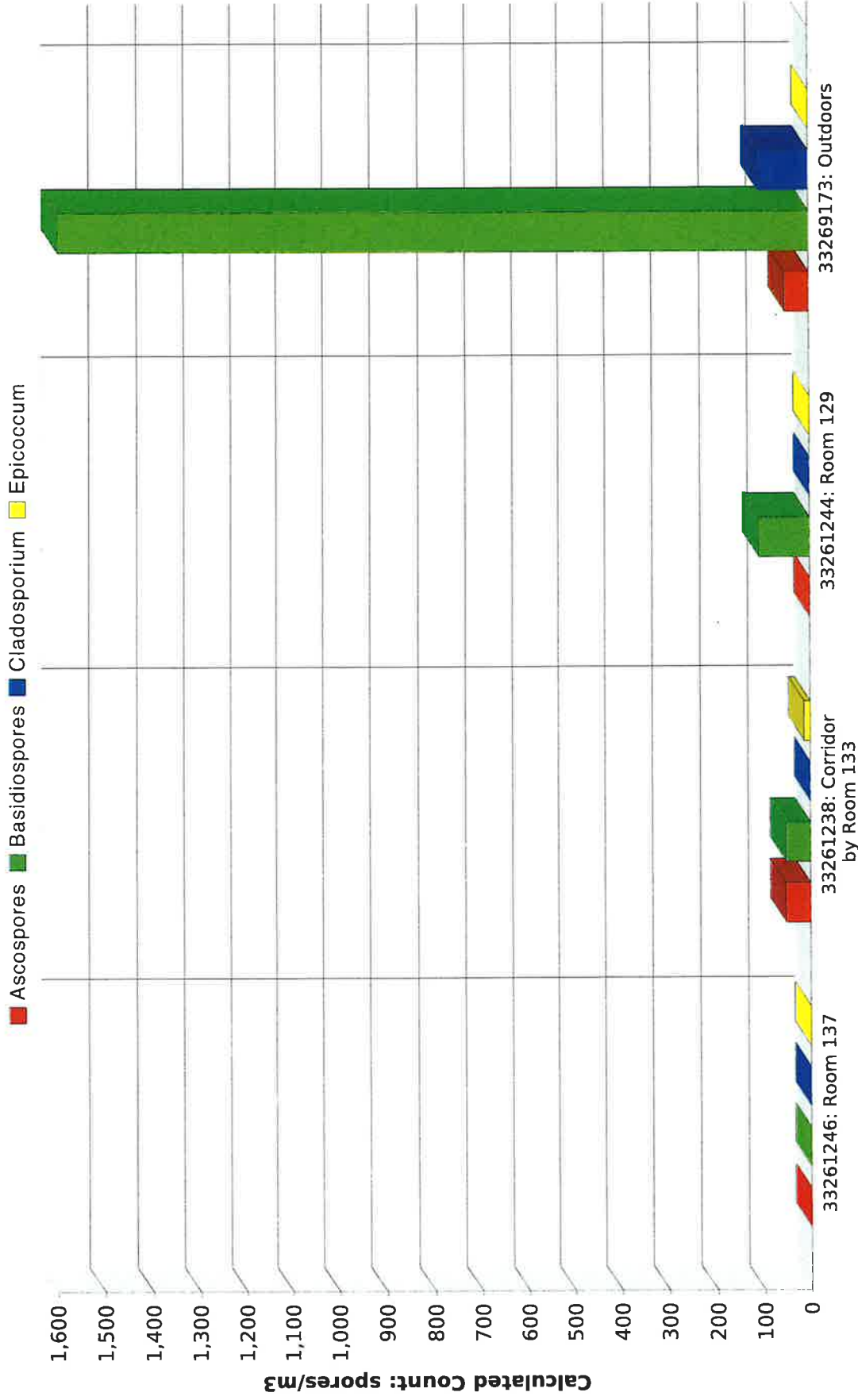
**** MoldSCORE™ is a specialized method for examining air sampling data. It is a score between 100 and 300, with 100 indicating a greater likelihood that the airborne indoor spores originated from the outside, and 300 indicating a greater likelihood that they originated from an inside source. The Result displayed is based on the numeric score given and will be either Low, Medium, or High, indicating a low, medium, or high likelihood that the spores detected originated from an indoor source. Eurofins EMLab P&K reserves the right to, and may at anytime, modify or change the MoldScore algorithm without notice.

Interpretation of the data contained in this report is left to the client or the persons who conducted the field work. This report is provided for informational and comparative purposes only and should not be relied upon for any other purpose. "Typical outdoor ranges" are based on the results of the analysis of samples delivered to and analyzed by Eurofins EMLab P&K and assumptions regarding the origins of those samples. Sampling techniques, contaminants infecting samples, unrepresentative samples and other similar or dissimilar factors may affect these results. With the statistical analysis provided, as with all statistical comparisons and analyses, false-positive and false-negative results can and do occur. Eurofins EMLab P&K hereby disclaims any liability for any and all direct, indirect, punitive, incidental, special or consequential damages arising out of the data contained in, or any actions taken or omitted in reliance upon, this report.

09-23-2022: Highland

Eurofins EMLab P&K
1815 West Diehl Road, Suite 800, Naperville, IL 60563
(866) 871-1984 Fax (856) 334-1040 www.emlab.com

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY



Comments:

Note: Graphical output may understate the importance of certain "marker" genera.
Eurofins EPK Built Environment Testing, LLC