HEALTH, SAFETY & RISK MANAGEMENT
Christopher Naney
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Environmental Hygiene Report

Submitted to: Mr. John Willabay
Director of Buildings and Grounds
Poughkeepsie City School District

Prepared by: Christopher Naney, Environmental Compliance Coordinator

Location	Clinton Elementary School
Project No.	010-1718
Site Visit	August 25 & September 7, 2017
Report Date	September 19, 2017
Investigator	Christopher Naney #MA00198

This survey is strictly limited to that which is identified in the Project Scope **of the report. Dutchess County BOCES *Health, Safety &Risk Management* does not assert that all potential health or safety hazards at this site were evaluated during this investigation.**

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Executive Summary

The Director of Buildings & Grounds for the Poughkeepsie City School District requested that our office perform an indoor air quality investigation in Room 30 of the Governor Clinton Elementary School. Occupants working in this area were concerned about efflorescence on the plaster wall. The results of initial air sampling showed highly elevated levels of fungal spores in this room. Subsequent visual inspection and air sampling indicated that the fungal spores were being entrained into the room from the adjacent exit vestibule and switch gear room. Please see the **Comments & Recommendations** section of this report.

Project Scope

Collect an air samples for total fungal structures within Room 30, the exit vestibule, the switch gear room and samples outside the building for comparison. Perform a visual inspection for conditions that may impact indoor air quality. Review the data and information and prepare a written report for the Poughkeepsie Central School District.

Materials & Methods

Air samples for total fungal structures were collected using a BIO-PUMP™ and 37-mm *Air-O-Cell*™ air sampling cassettes; both purchased from Zefon, International. This pump was calibrated to collect 15 liters per minute (lpm) of air throughout the 6- minute sampling period. All samples were securely packaged and shipped overnight via UPS to EMLab P&K Microbiology Services in Marlton, NJ for analysis.

Results Summary

Air Samples for Total Fungal Structures

August 25, 2017

Sample	Location	S/m^3*	Predominant Taxa	%
CLES082517-1	Room 30	6,900	Ascospores Basidiospores Cladosporium Penicillium/Aspergillus types	4 45 8 38
CLES082517-2	Outside Building	12,000	Ascospores Basidiospores Cladosporium	14 82 2

September 7, 2017

Sample	Location	S/m^3*	Predominant Taxa	%
CLES090717-1	Room 30	1,200	Ascospores Chaetomium Penicillium/Aspergillus types	68 2 30
CLES090717-2	Switch Gear Room	4,000	Basidiospores Cladosporium Penicillium/Aspergillus types	31 13 47
CLES090717-3	Vestibule	24,000	Chrysosporium Cladosporium Penicillium/Aspergillus types	81 3 13
CLES090717-4	Outside Building	11,000	Ascospores Basidiospores Cladosporium	9 76 12

***S/m^3- Fungal structures per cubic meter of air**

Discussion

Bioaerosols, airborne particles that are living or originate from living organisms, are ubiquitous in nature and may be modified by human activities. ***(2)*** They become an occupational hygiene concern when, as a result of indoor sources, the kinds and levels of microorganisms inside a building or facility are different than those in the surrounding outdoor environment. Microbiological growth inside buildings is normally the result of water intrusion (e.g. from roof

leaks), standing water, or high humidity and dew point. Bioaerosols of concern include fungi, bacteria, viruses, allergens, and other metabolic by products. Locating sources of bioaerosols inside buildings is heavily dependent upon good investigative techniques. Such techniques include, but are not wholly dependent upon, sampling. Sampling for bioaerosols includes air sampling and source (e.g. bulk, swab, tape-lift) sampling.

Comments & Recommendations

The Director of Buildings & Grounds for the Poughkeepsie City School District requested that our office perform and indoor air quality investigation in Room 30 of the Governor Clinton Elementary School. Occupants working in this area were concerned that efflorescence on the plaster wall was mold. The white crystals that form on the surface of the plaster walls called efflorescence are often calcium or magnesium salts. When excess moisture dissolves minerals in the plaster and moves to the surface, it eventually evaporates and leaves behind deposits of calcium sulfate ($CaCO_4$) commonly known as Plaster of Paris or magnesium sulfate ($MgSO_4$) also known as Epsom salts. These salts are indicative of past water intrusion and are not considered a threat to health and safety.

A visual inspection of Room 30 found that it was dirty with dust and debris (including fallen efflorescence) with evidence that furnishings had not been moved for cleaning for an extended period of time. Evidence of prior water intrusion was noted including rusted electrical conduit that could lead to an electrical hazard. A subsequent inspection of the exit vestibule and switch gear room found debris conducive to fungal growth, areas of fungal amplification and moisture intrusion in these areas.

Sampling for total fungal structures August 25, 2017 showed highly elevated levels of fungal spores in this room. Most spores identified were of ubiquitous outdoor species that seldom grow in indoor environments and were likely entrained from outside the building. Thirty percent of this sample showed Penicillium/Aspergillus type spores indicating past or present indoor fungal amplification. Sampling for total fungal structures September 7, 2017 showed lower spore counts in Room 30 with highly elevated spore counts in the exit vestibule and switch gear room indicating that fungal spores were being entrained into Room 30 from these areas.

During this investigation two fire code violations were also observed; a desk and chair blocking the exit and an extension cord in place of permanent wiring.

We have the following recommendations:

- Room 30, and all school rooms, should be subject to regular and periodic cleanings.
- The New York State Education Department Manual of Standards for Educational Facilities section S606-3a states: All occupied areas within school buildings shall be provided with mechanical ventilation of at least 15 cfm per occupant of outside air during periods of occupancy. Our office can be available to conduct a ventilation assessment in Room 30
- The door between Room 30 and the switch gear room has been sealed with plastic and tape, the exit door cannot be similarly sealed therefore the exit vestibule should be thoroughly cleaned and monitored for moisture intrusion.
- To discourage fungal amplification de-humidifiers should continue to be used in Room 30 until ambient humidity decreases in the colder months.
- The teacher's desk should be moved from in front of the emergency exit door and closer to electrical outlets negating the need for an extension cord.

Reference

1) **American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)**: *AHRAE Standard 62-2001 – Ventilation for Acceptable Indoor Air Quality.* Atlanta, GA: ASHREA, 2001

2) **University of Minnesota:** *Fungal Glossary.* Minneapolis, MN: University of Minnesota, Department of Environmental Health & Safety, 2004

3) **Yang, Chin:** *Basics in Investigation of Microbiological Contamination in Buildings.* Cherry Hill, NJ: P&K Microbiology Services, 1996.

4) **Yang, Chin:** *Fungi in the Air: What do Results of Fungal Air Samples Mean?*Cherry Hill, NJ: P&K Microbiology Services, 2003.

APPENDIX A

Laboratory Data

EMLab P&K
A TestAmerica Company

Report for:

Mr. Christopher Naney
Dutchess County BOCES
5 BOCES Road
SPC Bldg., Room 140
Poughkeepsie, NY 12601

Regarding: Project: CLES082517 Clinton Rm. 30; Clinton ES Room 30 IAQ
EML ID: 1782891

Approved by:

Technical Manager
Ariunaa Jalsrai

Dates of Analysis:
Spore trap analysis: 08-30-2017

Service SOPs: Spore trap analysis (EM-MY-S-1038)
AIHA-LAP, LLC accredited service, Lab ID #103005

EMLab P&K
3000 Lincoln Drive East, Suite A, Marlton, NJ 08053
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Client: Dutchess County BOCES
C/O: Mr. Christopher Naney
Re: CLES082517 Clinton Rm. 30; Clinton ES Room 30 IAQ

Date of Sampling: 08-25-2017
Date of Receipt: 08-28-2017
Date of Report: 08-30-2017

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	CLES082517-1: Room 30		CLES082517-2: Outside Building	
Comments (see below)	None		None	
Lab ID-Version‡:	8335379-1		8335380-1	
Analysis Date:	08/30/2017		08/30/2017	
	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria	4	44	2	22
Ascospores	6	270	38	1,700
Basidiospores	69	3,100	224	10,000
Chaetomium				
Cladosporium	13	580	6	270
Epicoccum	2	22		
Fusarium				
Ganoderma	6	270		
Myrothecium				
Nigrospora				
Other colorless				
Penicillium/Aspergillus types†	58	2,600		
Pithomyces	2	22		
Rusts	1	11	6	67
Smuts, Periconia, Myxomycetes			12	130
Stachybotrys				
Stemphylium				
Torula				
Ulocladium				
Zygomycetes				
Background debris (1-4+)††	2+		2+	
Hyphal fragments/m3	100		44	
Pollen/m3	< 11		160	
Skin cells (1-4+)	1+		< 1+	
Sample volume (liters)	90		90	
§ TOTAL SPORES/m3		6,900		12,000

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/m^3 divided by the raw count, expressed in spores/m^3. The limit of detection is the analytical sensitivity (in spores/m^3) multiplied by the sample volume (in liters) divided by 1000 liters.

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.

EMLab P&K
A TestAmerica Company

Report for:

Mr. Christopher Naney
Dutchess County BOCES
5 BOCES Road
SPC Bldg., Room 140
Poughkeepsie, NY 12601

Regarding: Project: CLES082517 Clinton Rm. 30; Clinton ES Room 30 IAQ
EML ID: 1782891

Approved by:

Technical Manager
Ariunaa Jalsrai

Dates of Analysis:
Spore trap analysis: 08-30-2017

Service SOPs: Spore trap analysis (EM-MY-S-1038)
AIHA-LAP, LLC accredited service, Lab ID #103005

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Client: Dutchess County BOCES
C/O: Mr. Christopher Naney
Re: CLES082517 Clinton Rm. 30; Clinton ES Room 30 IAQ

Date of Sampling: 08-25-2017
Date of Receipt: 08-28-2017
Date of Report: 08-30-2017

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Lab ID-Version‡ Location	Air vol. (L)	Background Debris	Counts of Fungal Structures	Fungal Structures/m3	Presumptive Fungal ID (raw counts*)	Percentage
8335379-1 08/30/2017	90	2+	4	44	Alternaria (4)	1
CLES082517-1			24	270	Ascospores (6)	4
Room 30			276	3,100	Basidiospores (69)	45
			52	580	Cladosporium (13)	8
			2	22	Epicoccum (2)	< 1
			24	270	Ganoderma (6)	4
			232	2,600	Penicillium/Aspergillus types (58)	38
			2	22	Pithomyces (2)	< 1
			1	11	Rusts (1)	< 1
				§ Total: 6,900		
			9	100	Hyphal fragments (9)	N/A
Comments:						
8335380-1 08/30/2017	90	2+	2	22	Alternaria (2)	< 1
CLES082517-2			152	1,700	Ascospores (38)	14
Outside Building			896	10,000	Basidiospores (224)	82
			24	270	Cladosporium (6)	2
			6	67	Rusts (6)	1
			12	130	Smuts, Periconia, Myxomycetes (12)	1
				§ Total: 12,000		
			4	44	Hyphal fragments (4)	N/A
			14	160	Pollen (14)	N/A
Comments:						

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/m^3 divided by the raw count, expressed in spores/m^3. The limit of detection is the analytical sensitivity (in spores/m^3) multiplied by the sample volume (in liters) divided by 1000 liters.

*All AIHA accredited laboratories are required to provide raw counts of fungal structures in spore trap reports. These counts are defined by AIHA as "Actual count without extrapolation or calculation". The number in parentheses next to the fungal type represents the exact number (or raw count) of fungal structures observed.

‡ 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 has been rounded to two significant figures to reflect analytical precision.

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Date of Sampling: 08-25-2017
Date of Receipt: 08-28-2017
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MoldRANGE™, Local Climate; Extended Outdoor Comparison

Outdoor Location: CLES082517-2, Outside Building

Fungi Identified	Outdoor data	Typical Outdoor Data for: August in New York† EMLab Local Climate code[1] A Annual Temp, B Elev., A Rain, A Temp. Range (n‡=0)						Typical Outdoor Data for: The entire year in New York† EMLab Local Climate code[1] A Annual Temp, B Elev., A Rain, A Temp. Range (n‡=183)					
Project zip code 12601	spores/m3	very low	low	med	high	very high	freq %	very low	low	med	high	very high	freq %
Generally able to grow indoors*													
Alternaria	22	-	-	-	-	-	-	11	13	30	80	130	37
Bipolaris/Drechslera group	-	-	-	-	-	-	-	-	-	-	-	-	4
Chaetomium	-	-	-	-	-	-	-	-	-	-	-	-	1
Cladosporium	270	-	-	-	-	-	-	51	80	320	1,200	2,600	81
Curvularia	-	-	-	-	-	-	-	11	12	22	54	92	15
Epicoccum	-	-	-	-	-	-	-	11	11	20	49	68	34
Ganoderma	-	-	-	-	-	-	-	43	48	130	220	300	13
Nigrospora	-	-	-	-	-	-	-	-	-	-	-	-	9
Penicillium/Aspergillus types	-	-	-	-	-	-	-	40	53	110	320	650	38
Pithomyces	-	-	-	-	-	-	-	11	11	29	94	820	23
Stachybotrys	-	-	-	-	-	-	-	-	-	-	-	-	< 1
Torula	-	-	-	-	-	-	-	-	-	-	-	-	4
Seldom found growing indoors**													
Ascospores	1,700	-	-	-	-	-	-	44	110	430	1,100	2,100	69
Basidiospores	10,000	-	-	-	-	-	-	53	130	1,200	6,800	11,000	93
Rusts	67	-	-	-	-	-	-	11	11	13	45	77	21
Smuts, Periconia, Myxomycetes	130	-	-	-	-	-	-	11	13	33	79	160	57
§ TOTAL SPORES/m3	12,000												

[1]EMLab Local Climate codes are a climate classification scheme for statewide geographic areas. The MoldRANGE™ Local Climate report uses the sampling location zip code to identify the EMLab Local Climate code in that area. Using information available from the NOAA weather database, the EMLab Local 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 Local 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 state for the time period and EMLab Local 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.

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Client: Dutchess County BOCES
C/O: Mr. Christopher Naney
Re: CLES082517 Clinton Rm. 30; Clinton ES Room 30 IAQ

Date of Sampling: 08-25-2017
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Understanding EMLab Local 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 Local Climate code system is a novel and patent pending classification system that uses data from the NOAA - National Oceanic and Atmospheric Administration database to define unique climate regions by state. The following local climate variables, for each statewide zip code, are obtained from NOAA and assigned a letter code of A (above the statewide average for that variable) or B (below the statewide 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 Local Climate Code. Below are some examples of decoded Local 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 local climate codes in each state are then compiled in a manner relating typical spore concentrations and frequency of occurrence.

The NOAA local 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 Local 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 EMLab P&K outdoor spore trap samples with known zip codes.

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

References:

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

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MoldSTAT™: Supplementary Statistical Spore Trap Report

Outdoor Summary: CLES082517-2: Outside Building

Species detected	Outdoor sample spores/m3 (<100 / 1K / 10K / >100K)	Typical outdoor ranges (North America)	Freq. %
Alternaria	22	7 - 33 - 480	43
Ascospores	1,700	13 - 210 - 6,300	77
Basidiospores	10,000	13 - 450 - 23,000	91
Cladosporium	270	27 - 480 - 9,500	90
Penicillium/Aspergillus types	< 11	13 - 180 - 2,600	67
Rusts	67	7 - 27 - 370	20
Smuts, Periconia, Myxomycetes	130	7 - 53 - 1,000	64
Total	12,000		

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 occurence 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: CLES082517-1: Room 30

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 56%	dF: N/A Result: N/A Critical value: N/A Inside Similar: N/A	Result: 0.6667	dF: 10 Result: 0.2818 Critical value: 0.5515 Outside Similar: No	Score: 298 Result: High

Species Detected	Spores/m3 (<100 / 1K / 10K / >100K)
Alternaria	44
Ascospores	270
Basidiospores	3,100
Cladosporium	580
Epicoccum	22
Ganoderma	270
Penicillium/Aspergillus types	2,600
Pithomyces	22
Rusts	11
Total	6,900

* 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.

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MoldSTAT™: Supplementary Statistical Spore Trap Report

** 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. EMLab P&Kreserves 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 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. 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.

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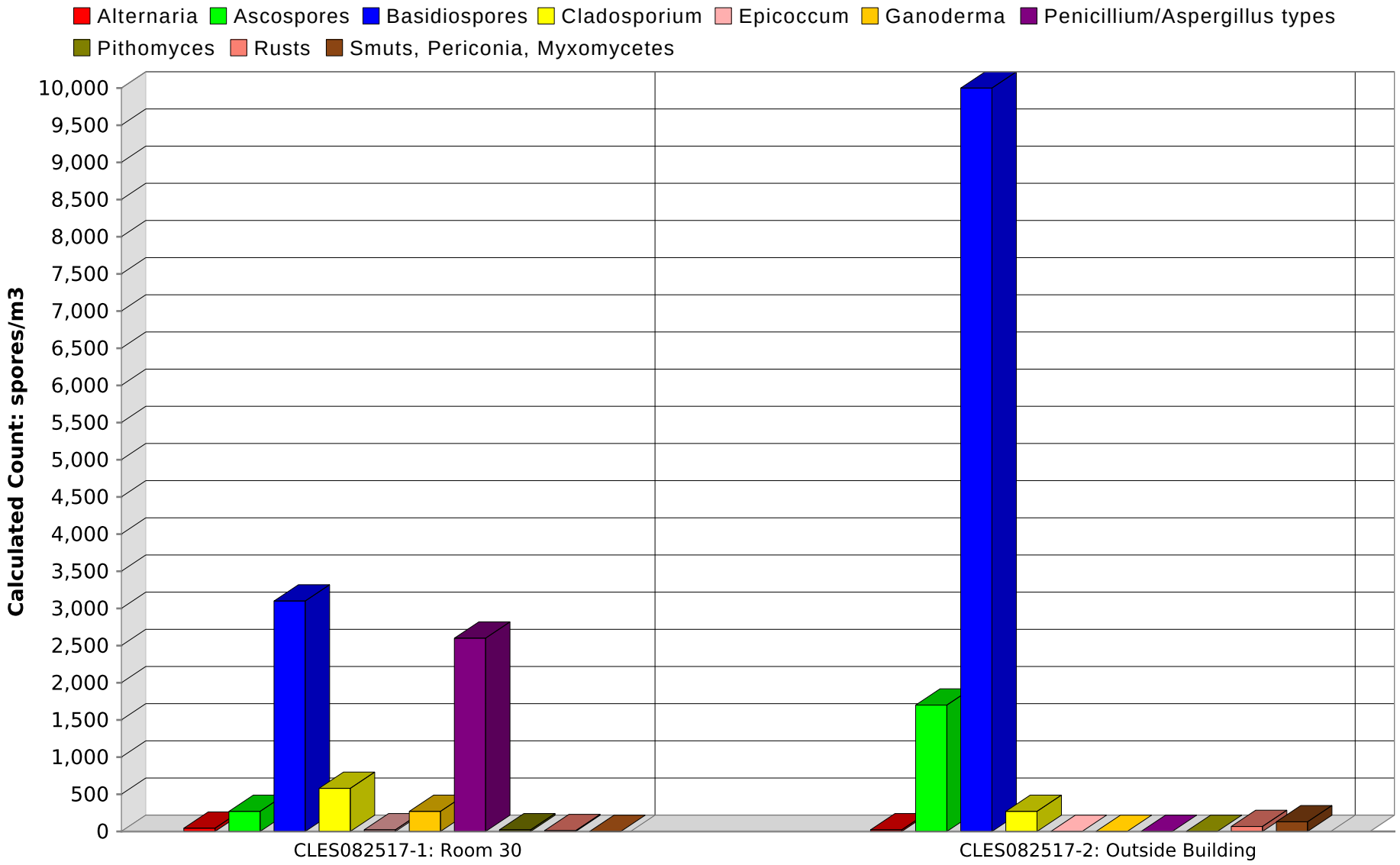
SPORE TRAP REPORT: NON-VIABLE METHODOLOGY



Comments:

Note: Graphical output may understate the importance of certain "marker" genera.

CHAIN-OF CUSTODY

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SSF, CA: 6000 Shoreline Court, Suite 205, South San Francisco, CA 94080 * (866) 888-6653

Weather		Fog	Rain	Snow	Wind	Clear
Level	None	☒	☒	☒	☒	☒
	Light	☐	☐	☐	☐	
	Moderate	☐	☐	☐	☐	
	Heavy	☐	☐	☐	☐	

EMLab ID: 1782891

CONTACT INFORMATION

Company:	Dutchess County BOCES (13311)	Address:	5 BOCES Road SPC Bldg., Room 140 Poughkeepsie, NY 12601 USA
Contact:	Christopher Nancy	Special Instructions:	
Phone:	845-486-8004 x2297		

PROJECT INFORMATION

Project ID:	CLES082517 Clinton Rm. 30		
Project Description:	Clinton ES Room 30 IAQ		
Project Zip Code:	12601	Sampling Date & Time:	08/25/2017 09:10 AM
PO Number:	18-00062	Sampled By:	

TURN AROUND TIME CODES (TAT)

STD – Standard (DEFAULT)
ND – Next Business Day
SD – Same Business Day Rush
WH – Weekend / Holiday

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

Sample ID	Description	Sample Type (Below)	TAT (Above)	Volume / Area (as applicable)	ISO Class (as applicable)	Notes (Time of day, Temp, RH, etc.)
CLES082517-1	Room 30	A	STD	90 liter		
CLES082517-2	Outside Building	A	STD	90 liter		

REQUESTED SERVICES

(Use checkboxes below)

Spore trap analysis
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SAMPLE TYPE CODES	RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
A - Spore Trap: Cassette	C. Nancy	08/25/17	Rita Lilly	8/28/17 10:00

By submitting this Chain of Custody, you agree to be bound by the terms and conditions set forth at http://www.emlab.com/s/main/serviceterms.html

EMLab P&K
A TestAmerica Company

Report for:

Mr. Christopher Naney
Dutchess County BOCES
5 BOCES Road
SPC Bldg., Room 140
Poughkeepsie, NY 12601

Regarding: Project: CLES090717 Clinton 30; Clinton ES Room 30
EML ID: 1790482

Approved by:

Technical Manager
Ariunaa Jalsrai

Dates of Analysis:
Spore trap analysis: 09-13-2017

Service SOPs: Spore trap analysis (EM-MY-S-1038)
AIHA-LAP, LLC accredited service, Lab ID #103005

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 items tested.

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.

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(866) 871-1984 Fax (856) 334-1040 www.emlab.com

Client: Dutchess County BOCES
C/O: Mr. Christopher Naney
Re: CLES090717 Clinton 30; Clinton ES Room 30

Date of Sampling: 09-07-2017
Date of Receipt: 09-11-2017
Date of Report: 09-13-2017

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	CLES090717-1: Room 30		CLES090717-2: Switch Gear Room		CLES090717-3: Vestibule		CLES090717-4: OPutside Building	
Comments (see below)	None		None		None		None	
Lab ID-Version‡:	8370888-1		8370889-1		8370890-1		8370891-1	
Analysis Date:	09/13/2017		09/13/2017		09/13/2017		09/13/2017	
	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria					4	44		
Ascospores			2	89	1	44	22	980
Basidiospores	18	800	28	1,200	7	310	184	8,200
Chaetomium	2	22	12	130	4	44		
Chrysosporium					214	20,000		
Cladosporium			12	530	19	840	29	1,300
Epicoccum			1	11				
Ganoderma			2	89			6	270
Myrothecium								
Nigrospora								
Other colorless								
Penicillium/Aspergillus types†	8	360	42	1,900	74	3,300		
Pithomyces			3	33			1	11
Rusts							1	11
Smuts, Periconia, Myxomycetes			1	11				
Stachybotrys					1	11		
Stemphylium								
Torula								
Ulocladium								
Zygomycetes								
Background debris (1-4+)††	2+		3+		4+		2+	
Hyphal fragments/m3	< 11		< 11		< 11		11	
Pollen/m3	< 11		< 11		< 11		67	
Skin cells (1-4+)	1+		1+		1+		< 1+	
Sample volume (liters)	90		90		90		90	
§ TOTAL SPORES/m3		1,200		4,000		24,000		11,000

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/m^3 divided by the raw count, expressed in spores/m^3. The limit of detection is the analytical sensitivity (in spores/m^3) multiplied by the sample volume (in liters) divided by 1000 liters.

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.

EMLab P&K
A TestAmerica Company

Report for:

Mr. Christopher Naney
Dutchess County BOCES
5 BOCES Road
SPC Bldg., Room 140
Poughkeepsie, NY 12601

Regarding: Project: CLES090717 Clinton 30; Clinton ES Room 30
EML ID: 1790482

Approved by:

Technical Manager
Ariunaa Jalsrai

Dates of Analysis:
Spore trap analysis: 09-13-2017

Service SOPs: Spore trap analysis (EM-MY-S-1038)
AIHA-LAP, LLC accredited service, Lab ID #103005

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Client: Dutchess County BOCES
C/O: Mr. Christopher Naney
Re: CLES090717 Clinton 30; Clinton ES Room 30

Date of Sampling: 09-07-2017
Date of Receipt: 09-11-2017
Date of Report: 09-13-2017

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Lab ID-Version‡ Location	Air vol. (L)	Background Debris	Counts of Fungal Structures	Fungal Structures/m3	Presumptive Fungal ID (raw counts*)	Percentage
8370888-1 09/13/2017	90	2+	72	800	Basidiospores (18)	68
CLES090717-1			2	22	Chaetomium (2)	2
Room 30			32	360	Penicillium/Aspergillus types (8)	30
				§ Total: 1,200		
Comments:						
8370889-1 09/13/2017	90	3+	8	89	Ascospores (2)	2
CLES090717-2			112	1,200	Basidiospores (28)	31
Switch Gear Room			12	130	Chaetomium (12)	3
			48	530	Cladosporium (12)	13
			1	11	Epicoccum (1)	< 1
			8	89	Ganoderma (2)	2
			168	1,900	Penicillium/Aspergillus types (42)	47
			3	33	Pithomyces (3)	1
			1	11	Smuts, Periconia, Myxomycetes (1)	< 1
				§ Total: 4,000		
Comments:						
8370890-1 09/13/2017	90	4+	4	44	Alternaria (4)	< 1
CLES090717-3			4	44	Ascospores (1)	< 1
Vestibule			28	310	Basidiospores (7)	1
			4	44	Chaetomium (4)	< 1
			1,783	20,000	Chrysosporium (214)	81
			76	840	Cladosporium (19)	3
			296	3,300	Penicillium/Aspergillus types (74)	13
			1	11	Stachybotrys (1)	< 1
				§ Total: 24,000		
Comments:						

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/m^3 divided by the raw count, expressed in spores/m^3. The limit of detection is the analytical sensitivity (in spores/m^3) multiplied by the sample volume (in liters) divided by 1000 liters.

*All AIHA accredited laboratories are required to provide raw counts of fungal structures in spore trap reports. These counts are defined by AIHA as "Actual count without extrapolation or calculation". The number in parentheses next to the fungal type represents the exact number (or raw count) of fungal structures observed.

‡ 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 has been rounded to two significant figures to reflect analytical precision.

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Re: CLES090717 Clinton 30; Clinton ES Room 30

Date of Sampling: 09-07-2017
Date of Receipt: 09-11-2017
Date of Report: 09-13-2017

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Lab ID-Version‡ Location	Air vol. (L)	Background Debris	Counts of Fungal Structures	Fungal Structures/m3	Presumptive Fungal ID (raw counts*)	Percentage
8370891-1 09/13/2017	90	2+	88	980	Ascospores (22)	9
CLES090717-4			736	8,200	Basidiospores (184)	76
OPutside Building			116	1,300	Cladosporium (29)	12
			24	270	Ganoderma (6)	2
			1	11	Pithomyces (1)	< 1
			1	11	Rusts (1)	< 1
				§ Total: 11,000		
			1	11	Hyphal fragments (1)	N/A
			6	67	Pollen (6)	N/A
Comments:						

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.

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Client: Dutchess County BOCES
C/O: Mr. Christopher Naney
Re: CLES090717 Clinton 30; Clinton ES Room 30

Date of Sampling: 09-07-2017
Date of Receipt: 09-11-2017
Date of Report: 09-13-2017

MoldRANGE™: Extended Outdoor Comparison

Outdoor Location: CLES090717-4, OPutside Building

Fungi Identified	Outdoor data	Typical Outdoor Data for: September in New York† (n‡=1935)						Typical Outdoor Data for: The entire year in New York† (n‡=17440)					
	spores/m3	very low	low	med	high	very high	freq %	very low	low	med	high	very high	freq %
Generally able to grow indoors*													
Alternaria	-	7	13	33	80	130	64	7	13	27	67	110	38
Bipolaris/Drechslera group	-	7	7	13	27	40	12	7	7	13	27	40	6
Chaetomium	-	7	7	13	13	36	4	7	7	13	27	47	4
Chrysosporium	-	-	-	-	-	-	< 1	-	-	-	-	-	< 1
Cladosporium	1,300	110	210	680	2,000	3,700	94	27	53	290	1,200	2,300	79
Curvularia	-	7	7	13	53	80	37	7	7	13	40	80	13
Epicoccum	-	7	11	25	53	93	44	7	7	20	53	87	29
Ganoderma	270	53	80	160	370	590	29	27	53	110	290	460	12
Nigrospora	-	7	7	13	31	53	22	7	7	13	27	53	9
Penicillium/Aspergillus types	-	40	67	200	600	1,100	54	27	40	110	350	670	48
Pithomyces	11	7	13	27	94	200	57	7	10	20	60	130	22
Stachybotrys	-	-	-	-	-	-	< 1	7	7	13	53	130	1
Torula	-	7	7	13	40	56	10	7	7	13	33	53	4
Seldom found growing indoors**													
Ascospores	980	67	130	400	1,100	1,800	96	27	53	290	1,100	2,000	75
Basidiospores	8,200	500	990	3,100	8,700	16,000	> 99	53	110	960	4,600	9,200	94
Rusts	11	7	13	27	67	130	50	7	10	20	53	110	20
Smuts, Periconia, Myxomycetes	-	13	13	42	120	230	78	7	13	27	87	160	55
§ TOTAL SPORES/m3	11,000												

†The 'Typical Outdoor Data' represents the typical outdoor spore levels for the location and time frame 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 enough data is not available to make a statistically meaningful assessment, it is indicated with a dash.

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

* 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.

‡n = number of samples used to calculate data.

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 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, EMLab P&K may not have received and tested a representative number of samples for every region or time period. 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.

EMLab P&K
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Client: Dutchess County BOCES
C/O: Mr. Christopher Naney
Re: CLES090717 Clinton 30; Clinton ES Room 30

Date of Sampling: 09-07-2017
Date of Receipt: 09-11-2017
Date of Report: 09-13-2017

MoldSTAT™: Supplementary Statistical Spore Trap Report

Outdoor Summary: CLES090717-4: OPutside Building

Species detected	Outdoor sample spores/m3 (<100 / 1K / 10K / >100K)	Typical outdoor ranges (North America)	Freq. %
Ascospores	980	13 - 210 - 6,300	77
Basidiospores	8,200	13 - 450 - 23,000	91
Cladosporium	1,300	27 - 480 - 9,200	90
Ganoderma	270	20 - 110 - 670	2
Penicillium/Aspergillus types	< 11	13 - 180 - 2,600	67
Pithomyces	11	7 - 27 - 490	14
Rusts	11	7 - 27 - 370	20
Smuts, Periconia, Myxomycetes	< 11	7 - 53 - 1,100	65
Total	11,000		

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 occurence 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: CLES090717-1: Room 30

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 10%	dF: 2 Result: 7.5417 Critical value: 5.9915 Inside Similar: No	Result: 0.2222	dF: 8 Result: 0.0476 Critical value: 0.6190 Outside Similar: No	Score: 156 Result: Medium

Species Detected	Spores/m3 (<100 / 1K / 10K / >100K)
Basidiospores	800
Chaetomium	22
Penicillium/Aspergillus types	360
Total	1,200

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Client: Dutchess County BOCES
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Re: CLES090717 Clinton 30; Clinton ES Room 30

Date of Sampling: 09-07-2017
Date of Receipt: 09-11-2017
Date of Report: 09-13-2017

MoldSTAT™: Supplementary Statistical Spore Trap Report

Location: CLES090717-2: Switch Gear Room

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 37%	dF: 2 Result: 7.5417 Critical value: 5.9915 Inside Similar: No	Result: 0.6667	dF: 10 Result: 0.3364 Critical value: 0.5515 Outside Similar: No	Score: 289 Result: High

Species Detected	Spores/m3 (<100 / 1K / 10K / >100K)
Ascospores	89
Basidiospores	1,200
Chaetomium	130
Cladosporium	530
Epicoccum	11
Ganoderma	89
Penicillium/Aspergillus types	1,900
Pithomyces	33
Smuts, Periconia, Myxomycetes	11
Total	4,000

Location: CLES090717-3: Vestibule

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 228%	dF: 2 Result: 7.5417 Critical value: 5.9915 Inside Similar: No	Result: 0.4286	dF: 11 Result: -0.0341 Critical value: 0.5273 Outside Similar: No	Score: 300 Result: High

Species Detected	Spores/m3 (<100 / 1K / 10K / >100K)
Alternaria	44
Ascospores	44
Basidiospores	310
Chaetomium	44
Chrysosporium	20,000
Cladosporium	840
Penicillium/Aspergillus types	3,300
Stachybotrys	11
Total	24,000

* 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.

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Client: Dutchess County BOCES
C/O: Mr. Christopher Naney
Re: CLES090717 Clinton 30; Clinton ES Room 30

Date of Sampling: 09-07-2017
Date of Receipt: 09-11-2017
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MoldSTAT™: Supplementary Statistical Spore Trap Report

** 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. EMLab P&Kreserves 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 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. 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.

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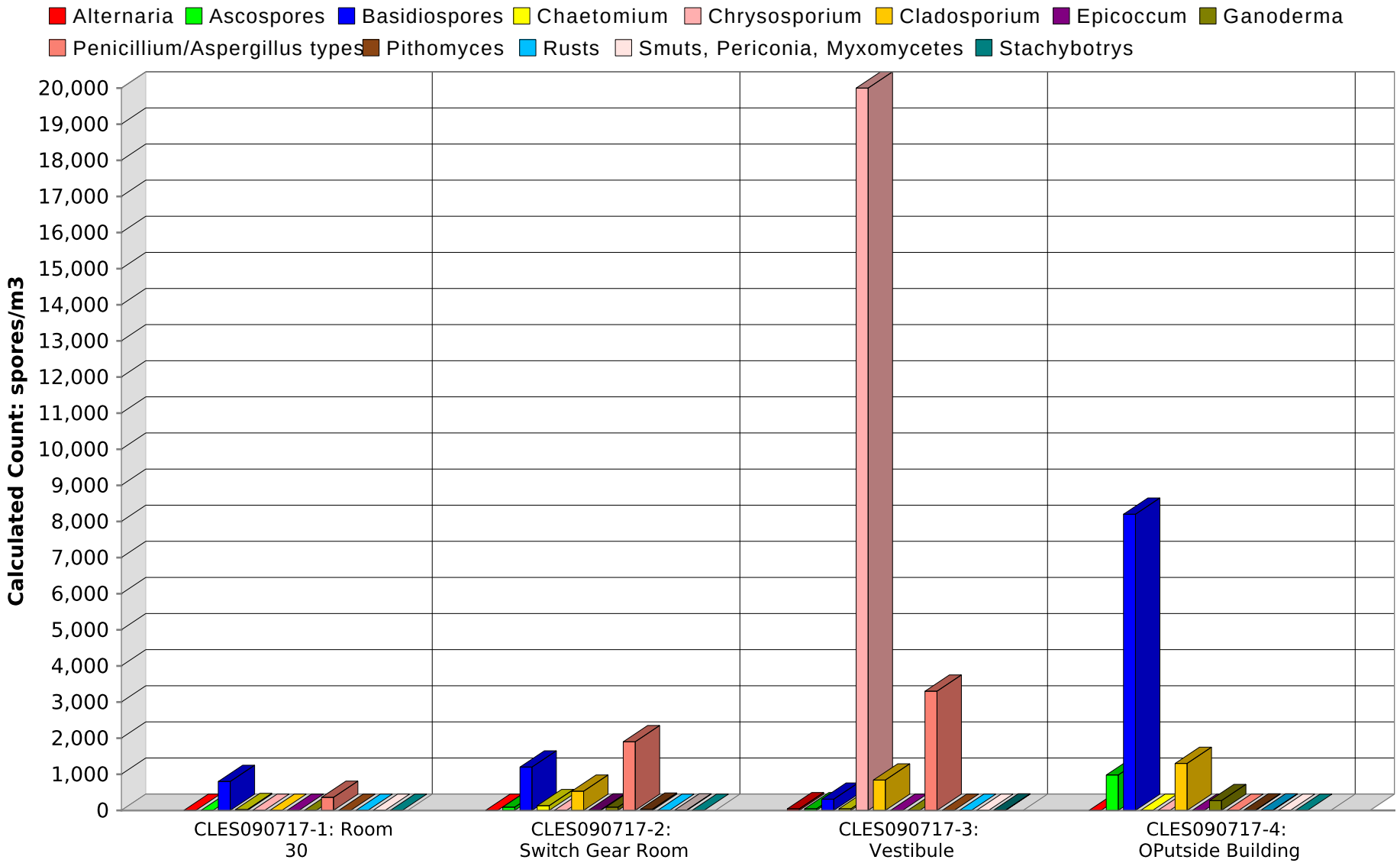
SPORE TRAP REPORT: NON-VIABLE METHODOLOGY



Comments:

Note: Graphical output may understate the importance of certain "marker" genera.

CHAIN OF CUSTODY

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Phoenix, AZ: 1501 West Knudsen Drive, Phoenix, AZ 85027 * (800) 651-4802
SSF, CA: 6000 Shoreline Court, Suite 205, South San Francisco, CA 94080 * (866) 888-4653

001790482

Weather		Fog	Rain	Snow	Wind	Clea
Level	None	☒	☒	☒	☐	
	Light	☐	☐	☐	☒	☒
	Moderate	☐	☐	☐	☐	
	Heavy	☐	☐	☐	☐	

CONTACT INFORMATION

Company:	Dutchess County BOCES (13311)	Address:	5 BOCES Road SPC Bldg., Room 140 Poughkeepsie, NY 12601 USA
Contact:	Christopher Naney	Special Instructions:	
Phone:	845-486-8004 x2297		

PROJECT INFORMATION

Project ID:	CLES090717 Clinton 30		
Project Description:	Clinton ES Room 30		
Project Zip Code:		Sampling Date & Time:	09/07/2017 03:33 PM
PO Number:	18-00062	Sampled By:	C. Naney

TURN AROUND TIME CODES (TAT)

STD – Standard (DEFAULT)
ND – Next Business Day
SD – Same Business Day Rush
WH – Weekend / Holiday

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

Sample ID	Description	Sample Type (Below)	TAT (Above)	Volume / Area (as applicable)	ISO Class (as applicable)	Notes (Time of day, Temp, RH, etc.)
CLES090717-1	Room 30	A	STD	90 liter		
CLES090717-2	Switch Gear Room	A	STD	90 liter		
CLES090717-3	Vestibule	A	STD	90 liter		
CLES090717-4	OPutside Building	A	STD	90 liter		

REQUESTED SERVICES

(Use checkboxes below)

Spore trap analysis					
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SAMPLE TYPE CODES	RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
A - Spore Trap: Cassette	C. Naney	09/08/17		9-8-17 9:48 FX

By submitting this Chain of Custody, you agree to be bound by the terms and conditions set forth at: http://www.emlab.com/s/mainfserviceterms.html

APPENDIX B

Fungal Glossary

Fungal Glossary

Species	Description
Alternaria	Some Alternaria species are plant pathogens and some are decomposers. Many species are allergens. These fungi are ubiquitous in outdoor air and not generally considered an indicator of poor indoor air quality.
Ascospores	Those from sac fungi such as truffles, morels, yeasts and many lichens
Basidiospores	Those from macrofungi commonly called mushrooms or toadstools.
Chaetomium spp.	Found on woody and straw materials. Readily grows on sheetrock paper. An allergen to some individuals
Chrysosporium spp.	Found in soil, and plant remains such as leaf litter
Cladosporium spp.	Some Cladosporium species are plant pathogens; others parasitize other fungi. These fungi are ubiquitous in outdoor air and not generally considered an indicator of poor indoor air quality.
Epicoccum spp.	Are plant and fungi pathogens
Ganoderma spp.	Are shelf and bracket macrofungi. Some species are cultivated for food or traditional medicine. Mainly found on living and dead wood.
Myxomycetes spp.	Non-fungal amoeboid with a life cycle that alternates between single cell individuals and sporulating colonial masses
Penicillium/Aspergillus type spp. (these spores cannot be differentiated by non-viable sampling methods)	*Penicillium* is a large genus of fungi. Some species are pathogenic to plants or animals, some are the source of antibiotic medications, and others are used in cheese and sausage making. *Aspergillus* is a large genus of fungi. Some species are pathogenic to plants or animals, some are used in the production of chemicals such as citric acid, and others are used in food and beverage production such as sake and soy sauce.
Periconia	Are plant pathogens
Pithomyces	A decomposer commonly found on dead leaves and grasses.
Rusts	Are plant pathogens
Smuts	Are gall forming pathogens of grasses. Not generally considered an indicator of poor indoor air quality
Stachybotrys	An indicator of severe water damage grows on cellulosic materials. Sticky spores not readily airborne.