HEALTH, SAFETY & RISK MANAGEMENT
Christopher Naney
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Environmental Hygiene Report

Submitted to: Mr. Joseph Jimick
Assistant Superintendent for Finance and Operations

Poughkeepsie City School District

Prepared by: Christopher Naney, Environmental Compliance Coordinator

Location	Warring Elementary School
Project No.	056-1617
Site Visit	April 10, 2017
Report Date	April 18, 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

On April 4, 2017 a representative of the County of Dutchess Department of Health contacted our office in regard to a complaint received about the Health Office in the Charles B. Warring Elementary School. On April 10, 2017 our office performed and indoor air quality investigation in the Warring Health Office and found that the area is in violation of New York State codes and regulations and is unfit for student and staff occupancy.

Please see the **Comments & Recommendations** section of this report.

Project Scope

Perform a visual inspection for conditions that may impact indoor air quality. Collect humidity, dew point CO_2 and other indoor air quality data in the Warring School Health Office and a sample outside the building for comparison. Collect an air sample for total fungal structures in the Warring School Health Office and a sample outside the building for comparison. Review the data and information and prepare a written report for the Poughkeepsie Central School District.

Materials & Methods

The air samples for total fungal structures were collected by Mold Assessor #MA00198 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 FedEx to EMLab P&K Microbiology Services in Marlton, NJ for analysis. The collection of indoor air quality parameters was performed using a Gray Wolf IQ-604 Indoor Air Quality Probe with PID connected to a DirectSense® IAQ LAP tablet. The data was transferred

from the hand held device to a desktop computer loaded with *WolfsensePC* software at our offices in Poughkeepsie, NY.

Results Summary

Indoor Air Quality Data

April 10, 2017

Location	Time	CO_2 ppm	Temp. °F	Humidity %RH	Dew Point °F	CO ppm
Health Office	09:12	1362	74.4	28.7	39.2	0.2
Health Office	09:27	793	74.1	28.4	39.3	0.2
Health Office	09:29	708	74.3	28.1	39.2	0.0
Outside Building	08:47	390	59.1	33.6	30.7	0.0

Air Samples for Total Fungal Structures

April 10, 2017

Sample	Location	S/m^3*	Predominant Taxa	%
WES041017-1	Health Office	290	Basidiospores Cladosporium Smuts, Periconia, Myxomycetes	62 31 8
WES041017-2	Outside Building	680	Ascospores Basidiospores Cladosporium Penicillium/Aspergillus types Smuts, Periconia, Myxomycetes	7 52 13 26 2

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

Discussion

The National Institute for Occupational Safety & Health (NIOSH), a division of the Center for Disease Control, uses the term Indoor Environmental Quality (IEQ) to describe the perception of the indoor environment by occupants of non-industrial facilities like offices and schools. Occupants of these facilities frequently report a variety of physical symptoms (e.g. headache, fatigue, eye & skin irritation) that they attribute to poor indoor air. If air is the culprit, there may be a number of causes, including chemical, physical, and biological contamination.

These contaminants can create odors, cause occupant discomfort, and, occasionally, create a health hazard. Frequently the cause of poor indoor air quality is inadequate or poorly modulated ventilation. This can result in uneven heating and cooling (which can affect the comfort of building occupants) and the provision of inadequate outside air.

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

On April 4, 2017 a representative of the County of Dutchess Department of Health contacted our office in regard to a complaint received about the Health Office in the Charles B. Warring Elementary School. On April 10, 2017 our office performed and indoor air quality investigation in the Warring Health Office and found that the area is in violation of New York State codes and regulations and is unfit for student and staff occupancy.

A visual inspection of the Health office found that this below grade area has no mechanical ventilation. The New York State Education Department Manual of Standards for Educational Facilities section S606-3 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. Therefore this area cannot serve as a health office or any other type of occupancy for students and staff. The visual inspection further found that the Health Office was not clean with accumulated dust, paint chips and debris. Accumulated dusts can negatively impact indoor air quality by becoming a reservoir for allergens such as pollen and fungal spores as well as pathogenic microorganisms. The Health Office was also found to have exposed heating pipes some of which have not been re-insulated after repairs. Exposed heating pipes coupled with a lack of ventilation can result in very low humidity, a situation that may increase viral transmission rates.

The laboratory results of sampling for total fungal structured showed low counts dominated by the common outdoor fungal types Basidiospores and Cladosporium species. Basidiospores are those from macrofungi commonly known as mushrooms or toadstools. Cladosporium, one of the most common genera, is a common allergen that is found in soils, leaf litter and decaying plant material. During the late summer and autumn these types of spores can reach very high levels in outdoor air. The similarity of spore types in the indoor and outdoor samples indicates that spores found in the building have been entrained from outside the building and are part of the building's dust load.

The collected indoor air quality data showed that the relative humidity was below the comfort range of between 40%-60% and dew points below what is required for normal fungal growth. The initial Carbon dioxide (CO_2) reading with the Health Office door closed at 1,362 parts per million (ppm) was well above the maximum acceptable limit of 1,090 ppm. CO_2 is an important IAQ parameter as it is used as a tracer gas to estimate ventilation rates. According to ASHRAE Standard 62-2001- *Ventilation for Acceptable Indoor Air Quality*, an indoor to outdoor

differential concentration not greater than about 700 ppm of CO_2 indicates comfort criteria related to human bioeffluents are likely to be satisfied. *(1)*

The **Regulations of the Commissioner of Education** section **136.2 d**. state that: *It shall be the duty of trustees and boards of education: to provide approved and adequate personnel and facilities;* Further, the New York State Education Department Manual of Standards for Educational Facilities section **S300** states: *The capacity of children to learn is impeded if their school environment contains elements which are hazardous to their health…Every child has a right to an environmentally safe and healthy learning environment which is clean and in good repair…* and, *School officials and appropriate public agencies should be held accountable for environmental safe and healthy school facilities*. (see **Appendix C**)

We have the following recommendations:

- The Health Office must be immediately relocated to an area with proper mechanical ventilation and adequate illumination that is sized and configured to meet the requirements of school health care in accordance with the Manual of Standards for Educational Facilities and all other State and Federal regulations.
- The Health Office should be thoroughly cleaned on a daily basis with an appropriate disinfectant product.

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: WES041017 Warring Health Office; C B Warring Elementary Health Office
EML ID: 1708226

Approved by:

Technical Manager
Ariunaa Jalsrai

Dates of Analysis:
Spore trap analysis: 04-12-2017

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.

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.

EMLab P&K
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(866) 871-1984 Fax (856) 334-1040 www.emlab.com

Client: Dutchess County BOCES
C/O: Mr. Christopher Naney
Re: WES041017 Warring Health Office; C B Warring
Elementary Health Office

Date of Sampling: 04-10-2017
Date of Receipt: 04-11-2017
Date of Report: 04-13-2017

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	WES041017-1: Health Office		WES041017-2: Outside Building	
Comments (see below)	None		None	
Lab ID-Version‡:	7963197-1		7963198-1	
Analysis Date:	04/12/2017		04/12/2017	
	raw ct.	spores/m3	raw ct.	spores/m3
Ascospores			1	44
Basidiospores	4	180	8	360
Chaetomium				
Cladosporium	2	89	2	89
Curvularia				
Epicoccum				
Fusarium				
Myrothecium				
Nigrospora				
Other colorless				
Penicillium/Aspergillus types†			4	180
Pithomyces				
Rusts				
Smuts, Periconia, Myxomycetes	2	22	1	11
Stachybotrys				
Stemphylium				
Torula				
Ulocladium				
Zygomycetes				
Background debris (1-4+)††	3+		2+	
Hyphal fragments/m3	< 11		< 11	
Pollen/m3	11		160	
Skin cells (1-4+)	2+		< 1+	
Sample volume (liters)	90		90	
§ TOTAL SPORES/m3		290		680

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.

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EML ID: 1708226

Approved by:

Technical Manager
Ariunaa Jalsrai

Dates of Analysis:
Spore trap analysis: 04-12-2017

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.

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Elementary Health Office

Date of Sampling: 04-10-2017
Date of Receipt: 04-11-2017
Date of Report: 04-13-2017

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
7963197-1 04/12/2017	90	3+	16	180	Basidiospores (4)	62
WES041017-1			8	89	Cladosporium (2)	31
Health Office			2	22	Smuts, Periconia, Myxomycetes (2)	8
				§ Total: 290		
			1	11	Pollen (1)	N/A
Comments:						
7963198-1 04/12/2017	90	2+	4	44	Ascospores (1)	7
WES041017-2			32	360	Basidiospores (8)	52
Outside Building			8	89	Cladosporium (2)	13
			16	180	Penicillium/Aspergillus types (4)	26
			1	11	Smuts, Periconia, Myxomycetes (1)	2
				§ Total: 680		
			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: 04-10-2017
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MoldRANGE™, Local Climate; Extended Outdoor Comparison

Outdoor Location: WES041017-2, Outside Building

Fungi Identified	Outdoor data	Typical Outdoor Data for: April in New York† EMLab Local Climate code¹ 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 code¹ 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	-	-	-	-	-	-	-	11	13	30	80	130	37
Bipolaris/Drechslera group	-	-	-	-	-	-	-	-	-	-	-	-	4
Chaetomium	-	-	-	-	-	-	-	-	-	-	-	-	1
Cladosporium	89	-	-	-	-	-	-	51	80	320	1,200	2,600	81
Curvularia	-	-	-	-	-	-	-	11	12	22	54	92	15
Nigrospora	-	-	-	-	-	-	-	-	-	-	-	-	9
Penicillium/Aspergillus types	180	-	-	-	-	-	-	40	53	110	320	650	38
Stachybotrys	-	-	-	-	-	-	-	-	-	-	-	-	< 1
Torula	-	-	-	-	-	-	-	-	-	-	-	-	4
Seldom found growing indoors**													
Ascospores	44	-	-	-	-	-	-	44	110	430	1,100	2,100	69
Basidiospores	360	-	-	-	-	-	-	53	130	1,200	6,800	11,000	93
Rusts	-	-	-	-	-	-	-	11	11	13	45	77	21
Smuts, Periconia, Myxomycetes	11	-	-	-	-	-	-	11	13	33	79	160	57
§ TOTAL SPORES/m3	680												

¹EMLab 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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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: WES041017-2: Outside Building

Species detected	Outdoor sample spores/m3 (<100 / 1K / 10K / >100K)	Typical outdoor ranges (North America)	Freq. %
Ascospores	44	13 - 210 - 6,400	77
Basidiospores	360	13 - 440 - 24,000	91
Cladosporium	89	27 - 480 - 9,800	90
Penicillium/Aspergillus types	180	13 - 170 - 2,600	67
Smuts, Periconia, Myxomycetes	11	7 - 53 - 910	64
Total	680		

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: WES041017-1: Health Office

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 42%	dF: N/A Result: N/A Critical value: N/A Inside Similar: N/A	Result: 0.7500	dF: 5 Result: 0.4250 Critical value: 0.8000 Outside Similar: No	Score: 114 Result: Low

Species Detected	Spores/m3 (<100 / 1K / 10K / >100K)
Basidiospores	180
Cladosporium	89
Smuts, Periconia, Myxomycetes	22
Total	290

* 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.

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MoldSTAT™: Supplementary Statistical Spore Trap Report

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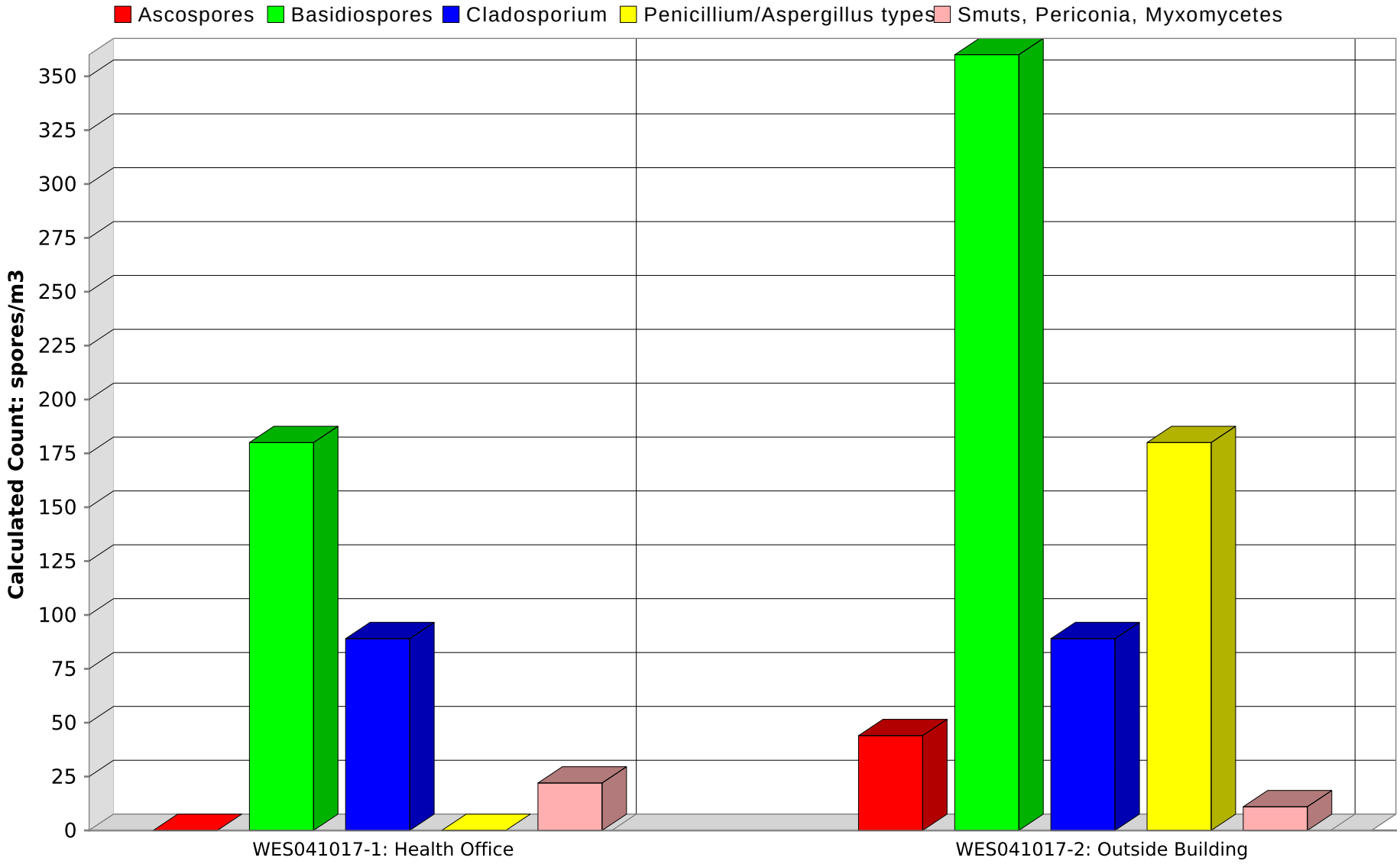
(866) 871-1984 Fax (856) 334-1040 www.emlab.com

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY



Comments:

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

CHAIN OF CUSTODY
www.EMLabPK.com

New Jersey: 3000 Lincoln Drive East, Suite A, Marlton, NJ 08053 * (866) 871-1984
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) 888-6653

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

001708226

REQUESTED SERVICES (Use checkboxes below)

CONTACT INFORMATION

Company:	Dutchess County BOCES (13311)	Address: 5 BOCES Road SPC Bldg., Room 140 Poughkeepsie, NY 12601 USA	
Contact:	Christopher Nanay	Special Instructions:	
Phone:	845-486-8004 x297		

PROJECT INFORMATION

Project ID:	WES041017 Warring Health Office		
Project Description:	C B Warring Elementary Health Office		
Project Zip Code:	12601	Sampling Date & Time:	04/10/2017 09:20 ~~PM~~ Am
PO Number:	17-00044	Sampled By: C. Nanay	

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.)	Spore trap analysis					
WES041017-1	Health Office	A	STD	90 liter			☒	☐	☐	☐	☐	☐
WES041017-2	Outside Building	A	STD	90 liter			☒	☐	☐	☐	☐	☐

SAMPLE TYPE CODES		RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
A - Spore Trap: Cassette		C. Nanay [signature]	04/10/17	[signature]	4/11/17 [illegible]

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/servicetems.html

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APPENDIX B

Fungal Glossary

Fungal Glossary

Species	Description
Ascospores	Those from sac fungi such as truffles, morels, yeasts and many lichens
Basidiospores	Those from macrofungi commonly called mushrooms or toadstools.
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.
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
Smuts	Are gall forming pathogens of grasses. Not generally considered an indicator of poor indoor air quality

APPENDIX C

Cited Regulations

Official Compilation of Codes, Rules and Regulations of The State of New York

Title 8 Education Department

Chapter II Regulations of the Commissioner

Subchapter G Health and Physical Education

Part 136 Health Service

Section 136.2 General regulations.

a. All schools under the jurisdiction of the State Education Department shall provide a program of health services.
b. School health services shall be provided by each school district for all students attending the public schools in this State, except in the city school districts of the cities of New York, Buffalo and Rochester, in accordance with law and the regulations. School health services shall include the services of a registered professional nurse, if one is employed, and shall also include such services as may be rendered as provided herein in examining students for the existence of disease or disability and in testing the eyes and ears of such students.
c. The trustees or board of education of each school district shall employ, at a compensation to be agreed upon by the parties, a director of school health services.
d. It shall be the duty of trustees and boards of education:
    1. to provide approved and adequate personnel and facilities;
    2. to maintain for each student cumulative records covering the essential features of the health services program; and
    3. to make such reports to the department as may be required on forms prescribed by the commissioner.

Full document:
http://usny.nysed.gov/regulations.html

Manual of Planning Standards for School Buildings

S2 AUTHORITY

S2-2 Planning Standards

a. The authority for the standards set forth in this Manual is derived from:

1. Regents Rules, Section 14.1 See Appendix D.

2. Commissioner's Regulations, Title 8, NYCRR, Part 155. See Appendix D.

S300 GENERAL

a. Although focused on teaching and learning, education must also address the need to maintain a safe, secure, and healthy school environment. The capacity of children to learn is impeded if their school environment contains elements which are hazardous to their health. The State Education Department and educators throughout the State of New York have a responsibility to assure the school community and the public that, based on the best available knowledge, school buildings are safe, healthy, clean and in good repair.

In December 1994, the New York State Board of Regents adopted the following guiding principles developed by the Regents Advisory Committee on Environmental Quality in Schools:

1. Every child has a right to an environmentally safe and healthy learning environment which is clean and in good repair.

2. Every child, parent, and school employee has a "right to know" about environmental health issues and hazards in their school environment.

3. School officials and appropriate public agencies should be held accountable for environmental safe and healthy school facilities.

4. Schools should serve as role models for environmentally responsible behavior.

5. Federal, State, local, and private sector entities should work together to ensure that resources are used effectively and efficiently to address environmental health and safety concerns.

b. The environment of a facility is a prime element in the learning process. To be successful, it must carefully blend and balance of many considerations. Students and teachers must be able to see and hear clearly, and be comfortable and healthy. The various visual and mental tasks, natural and artificial lighting, brightness, glare, room proportions, wall colors and finishes, furnishings, ergonomics, and the ability to demonstrate and use equipment are some of the many things that must be considered.

S606-3 Ventilating

a. 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. During ventilation and cooling cycle, supply, return, and exhaust air handling equipment shall provide for variable introduction of outdoor air from 0% to 100% fan capacity, with proportionate increases of exhaust air and decreases in return air. Outside air may be shut down to 0% only when the building is not physically occupied. Systems requiring quantities of cold air to be heated to an acceptable discharge temperature during a cooling cycle shall be avoided.

b. Interior spaces of pupil occupancy which are approved because of educational program shall be provided with equipment for mechanical cooling when natural cooling provided by outdoor air cannot maintain a temperature of 74º F.in the spaces. See S606-5g.

c. Classrooms may not be vented into corridors. Ceiling spaces over corridors may serve as plenums for exhausting classrooms however, when such spaces are used as plenums, the plenum must be of fire-resistive construction and be fire rated to maintain the required fire rating separation of the corridor from fire in the space above and to either side.

d. Air intakes shall not be located adjacent to school bus loading/unloading areas, loading docks, or air exhaust vents.

e. School districts shall operate and, where necessary, upgrade the operation of heating, ventilation and air-conditioning systems to meet the ventilation standards of the American Society for Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), where needed and feasible.

Full document:
http://www.p12.nysed.gov/facplan/documents/mps1998.pdf