HEALTH, SAFETY & RISK MANAGEMENT
Brian Colandrea
Program Coordinator

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Environmental Hygiene Report

Submitted to: Mr. John Willabay
Director of Facilities

Poughkeepsie City School District

Prepared by: Brian Colandrea, Safety and Risk Coordinator

Location	Krieger Elementary School
Project No.	034-1819
Site Visits	October 10, 2018
Report Date	October 24, 2018
Investigator	Brian Colandrea CMA #01300

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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Author's Note: Parenthetical numerals at the end of a sentence reference the work with the corresponding notation in the **References** section. ***Please read this report in its entirety, including any attached appendices, to fully understand this investigation.***

Executive Summary

On October 8, 2018 the Facilities Department for the Poughkeepsie City School District (PCSD) requested that our office perform air sampling for airborne fungal spores in Krieger Elementary. On October 10 we performed the requested sampling. The results of the sampling revealed nothing of concern. A visual inspection revealed water stained ceiling tiles in Room 204. Recommendations concerning this were made (see **Comments & Recommendations**).

Project Scope

Take air samples for fungal spores in corridors of Krieger Elementary School. Review the data and prepare a written report for the PCSD.

Materials & Methods

Air sampling for fungal spores was performed using a Zefon, Bio-Pump Plus calibrated to 15 liters per minute (LPM), each sample was collected for 6 minutes. Each air sample was collected on a Zefon Air-O-Cell cassette. The samples, once collected were then packaged and delivered via UPS to Aerobiology Laboratory Associates Inc., (AIHA-LAP EMLAP# 102747) located in Pennsauken, New Jersey for analysis. Each sample was taken by a NYS certified Mold Assessor (cert # MA01300).

Results Summary

All sample results and other data were reported to the administration of the local educational agency (LEA) via phone, fax, or e-mail as they became available to our department.

***For Full Sampling Results See Appendix**

Air Samples

Sample ID	Sample Location	Spore Identification in spr/m^3*
1018-KR1	Basement Stairwell	ascospores- 2889 basidiospores- 1867 Cladosporium- 1244 Epicoccum- 44 Penicillium/Aspergillus group- 356 Smuts, Periconia, Myxomycetes- 400 Stachybotrys- 133
1018-KR2	Corridor by Room 112	ascospores- 1556 basidiospores- 667 Cladosporium- 1200 Curvularia- 89 Drechslera/Bipolaris group- 44 Epicoccum- 44 hyphal elements- 133 Smuts, Periconia, Myxomycetes- 1333
1018-KR3	Corridor by Room 103	ascospores- 1911 basidiospores- 2756 Chaetomium- 44 Cladosporium- 2311 Penicillium/Aspergillus group- 356 Smuts, Periconia, Myxomycetes- 489
1018-KR4	Corridor by Room 217	ascospores- 3022 basidiospores- 3556 Cladosporium- 1244 Smuts, Periconia, Myxomycetes- 178
1018-KR5	Corridor by Room 204	ascospores- 1156 basidiospores- 489 Cladosporium- 1422 Penicillium/Aspergillus group- 222 Pithomyces- 44 Smuts, Periconia, Myxomycetes- 133

1018-KR6	Outdoor Comparison Sample	Alternaria- 89 ascospores- 8756 basidiospores- 5911 Cladosporium- 3467 Epicoccum- 44 hyphal elements- 44 Nigrospora- 89 Pithomyces- 44 Smuts, Periconia, Myxomycetes- 356

*spores per meter cubed

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. ***(1)*** 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 building 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 October 8, 2018 the Facilities Department for the Poughkeepsie City School District (PCSD) requested that our office perform air sampling for airborne fungal spores in Krieger Elementary. On October 10 we performed the requested sampling. The results of the sampling revealed nothing of concern. A visual inspection revealed water stained ceiling tiles in Room 204. The following recommendations are made:

- Room 204, replace water stained ceiling tiles

References

1. **University of Minnesota:** *Fungal Glossary*. Minneapolis, MN: University of Minnesota, Department of Environmental health & Safety, 2004

Appendix A

Laboratory Results

Aerobiology Laboratory Associates, Incorporated
Expertise Since 1997

Lab Use: 18038677

ELITE AZ, CA, CO, FL, GA, VA, NJ

NVLAP AZ, CA, CO, VA

AZ, CA, CO, FL GA, NJ, VA

Aerobiology Client	Dutchess BOCES						
Field Contact	Brian Colandrea	Collected By/Date: Brian Colandrea 10/10/18		Relinquished By/Date: Brian Colandrea 10/11/18			
Reporting Address	5 BOCES Road, Poughkeepsie, NY 12601	Relinquished By/Date:		Received By/Date: 10/12/18 10 Am			
Billing Address	Same	Sampler Type	Andersen ☐	SAS ☐	SampleAire ☐	AeroTrap ☐	Other X BioCulture ☐
Phone/Fax	845-486-8087, fax # 845-486-4818	PO#/Job#:					
Reporting Email (s)	brian.colandrea@dcboces.org	Project Name: Poughkeepsie CSD, Krieger Elementary					
Routine ☒	24 Hour ☐	Same Day ☐	4 Hour ☐	2 Hour ☐	Notes:		
SAMPLING LOCATION ZIP CODE	12603	CC Info:					

	Sample No.	Test Code	Sample Location	Total Volume/Area
1	1018-KR1	1054	basement by vending machines	90L
2	1018-KR2	1054	corridor by Room 112	90L
3	1018-KR3	1054	corridor by Room 103	90L
4	1018-KR4	1054	corridor by Room 217	90L
5	1018-KR5	1054	corridor by Room 204	90L
6	1018-KR6	1054	outdoor comparison sample	90L
7				
8				
9				
10				
11				
12				
13				
14				
15				

1054	Direct, Non-viable Spore Trap	1015	Culture - WATER Legionella
1051	Direct, Qualitative- **Swab/Tape**	1017	Culture - SWAB Legionella
1050	Direct, Qualitative- **Bulk**	1010	WATER - Potable - E. coli/total coliforms
1005	AIR Culture - Bacterial Count w/ ID's	1012	SWAB - E. coli/total coliforms
1030	AIR Culture - Fungal Count w/ ID's	1028	SWAB - Sewage Screen (E. coli/Entero/fecal coliforms)
1006	SWAB Culture - Bacterial Count w/ ID's	2056	WATER - Heterotrophic Plate Count
1031	SWAB Culture - Fungal Count w/ ID's	3001	ASBESTOS - Point count
1008	BULK Culture - Bacterial Count w/ ID's	3002	ASBESTOS - PLM Analysis
1033	BULK Culture - Fungal Count w/ ID's	3003	ASBESTOS - Particle characterization
1007	WATER Culture - Bacterial Count w/ID's	3004	ASBESTOS - PCM Analysis

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Pennsauken, New Jersey 08109
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www.aerobiology.net

Certificate of Analysis
AIHA-LAP EMLAP# 102747

Dutchess BOCES
5 Boces Road
Poughkeepsie, New York 12601
Attn: Brian Colandrea
Project: **POUGHKEEPSIE CSD, KRIEGER ELEMENTARY**
Condition of Sample(s) Upon Receipt: Acceptable

Date Collected: 10/10/2018
Date Received: 10/12/2018
Date Analyzed: 10/17/2018
Date Reported: 10/17/2018
Project ID: 18038677

1054 Spore Trap Analysis: SOP 3.8

Client Sample Number	**1018-KR1**				**1018-KR6**			
Sample Location	**BASEMENT BY VENDING MACHINES**				**OUTDOOR COMPARISON SAMPLE**			
Sample Volume (L)	**90**				**90**			
Lab Sample Number	**18038677-001**				**18038677-006**			
Spore Identification	Raw Ct	spr/m³	% Ttl	In/Out	Raw Ct	spr/m³	% Ttl	In/Out
Alternaria	-	-	-	-	2	89	<1	-
ascospores	65	2889	42	1/3	197	8756	47	-
basidiospores	42	1867	27	1/3	133	5911	31	-
Cladosporium	28	1244	18	1/3	78	3467	18	-
Epicoccum	1	44	1	1/1	1	44	<1	-
hyphal elements	-	-	-	-	1	44	<1	-
Nigrospora	-	-	-	-	2	89	<1	-
Penicillium/Aspergillus group	8	356	5	-	-	-	-	-
Pithomyces	-	-	-	-	1	44	<1	-
Smuts,Periconia,Myxomycetes	9	400	6	1/1	8	356	2	-
Stachybotrys	3	133	2	-	-	-	-	-
	Debris Rating **3**				Debris Rating **3**			
Analytical Sensitivity	Analytical Sensitivity: **11** spr/m³				Analytical Sensitivity: **11** spr/m³			
Comments								
Total *See Footnotes	156	6933	~100%	1/3	423	18800	~100%	-

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Condition of Sample(s) Upon Receipt: Acceptable

Date Collected: 10/10/2018
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Date Reported: 10/17/2018
Project ID: 18038677

Client Sample Number	**1018-KR2**				**1018-KR6**			
Sample Location	**CORRIDOR BY ROOM 112**				**OUTDOOR COMPARISON SAMPLE**			
Sample Volume (L)	**90**				**90**			
Lab Sample Number	**18038677-002**				**18038677-006**			
Spore Identification	Raw Ct	spr/m³	% Ttl	In/Out	Raw Ct	spr/m³	% Ttl	In/Out
Alternaria	-	-	-	-	2	89	<1	-
ascospores	35	1556	31	1/6	197	8756	47	-
basidiospores	15	667	13	1/9	133	5911	31	-
Cladosporium	27	1200	24	1/3	78	3467	18	-
Curvularia	2	89	2	-	-	-	-	-
Drechslera/Bipolaris group	1	44	1	-	-	-	-	-
Epicoccum	1	44	1	1/1	1	44	<1	-
hyphal elements	3	133	3	3/1	1	44	<1	-
Nigrospora	-	-	-	-	2	89	<1	-
Pithomyces	-	-	-	-	1	44	<1	-
Smuts,Periconia,Myxomycetes	30	1333	26	4/1	8	356	2	-
	Debris Rating **3**				Debris Rating **3**			
Analytical Sensitivity	Analytical Sensitivity: **11** spr/m³				Analytical Sensitivity: **11** spr/m³			
Comments								
Total *See Footnotes	114	5067	~100%	1/4	423	18800	~100%	-

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Date Analyzed: 10/17/2018
Date Reported: 10/17/2018
Project ID: 18038677

Client Sample Number	**1018-KR3**				**1018-KR6**			
Sample Location	**CORRIDOR BY ROOM 103**				**OUTDOOR COMPARISON SAMPLE**			
Sample Volume (L)	**90**				**90**			
Lab Sample Number	**18038677-003**				**18038677-006**			
Spore Identification	Raw Ct	spr/m³	% Ttl	In/Out	Raw Ct	spr/m³	% Ttl	In/Out
Alternaria	-	-	-	-	2	89	<1	-
ascospores	43	1911	24	1/5	197	8756	47	-
basidiospores	62	2756	35	1/2	133	5911	31	-
Chaetomium	1	44	1	-	-	-	-	-
Cladosporium	52	2311	29	1/2	78	3467	18	-
Epicoccum	-	-	-	-	1	44	<1	-
hyphal elements	-	-	-	-	1	44	<1	-
Nigrospora	-	-	-	-	2	89	<1	-
Penicillium/Aspergillus group	8	356	5	-	-	-	-	-
Pithomyces	-	-	-	-	1	44	<1	-
Smuts,Periconia,Myxomycetes	11	489	6	1/1	8	356	2	-
	Debris Rating **3**				Debris Rating **3**			
Analytical Sensitivity	Analytical Sensitivity: **11** spr/m³				Analytical Sensitivity: **11** spr/m³			
Comments								
Total *See Footnotes	177	7867	~100%	1/2	423	18800	~100%	-

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Condition of Sample(s) Upon Receipt: Acceptable

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Date Reported: 10/17/2018
Project ID: 18038677

Client Sample Number	1018-KR4				1018-KR6			
Sample Location	CORRIDOR BY ROOM 217				OUTDOOR COMPARISON SAMPLE			
Sample Volume (L)	90				90			
Lab Sample Number	18038677-004				18038677-006			
Spore Identification	Raw Ct	spr/m³	% Ttl	In/Out	Raw Ct	spr/m³	% Ttl	In/Out
Alternaria	-	-	-	-	2	89	<1	-
ascospores	68	3022	38	1/3	197	8756	47	-
basidiospores	80	3556	44	1/2	133	5911	31	-
Cladosporium	28	1244	16	1/3	78	3467	18	-
Epicoccum	-	-	-	-	1	44	<1	-
hyphal elements	-	-	-	-	1	44	<1	-
Nigrospora	-	-	-	-	2	89	<1	-
Pithomyces	-	-	-	-	1	44	<1	-
Smuts,Periconia,Myxomycetes	4	178	2	1/2	8	356	2	-
	Debris Rating **3**				Debris Rating **3**			
Analytical Sensitivity	Analytical Sensitivity: **11** spr/m³				Analytical Sensitivity: **11** spr/m³			
Comments								
Total *See Footnotes	180	8000	~100%	1/2	423	18800	~100%	-

Client Sample Number	1018-KR5				1018-KR6			
Sample Location	CORRIDOR BY ROOM 204				OUTDOOR COMPARISON SAMPLE			
Sample Volume (L)	90				90			
Lab Sample Number	18038677-005				18038677-006			
Spore Identification	Raw Ct	spr/m³	% Ttl	In/Out	Raw Ct	spr/m³	% Ttl	In/Out
Alternaria	-	-	-	-	2	89	<1	-
ascospores	26	1156	33	1/8	197	8756	47	-
basidiospores	11	489	14	1/12	133	5911	31	-
Cladosporium	32	1422	41	1/2	78	3467	18	-
Epicoccum	-	-	-	-	1	44	<1	-
hyphal elements	-	-	-	-	1	44	<1	-
Nigrospora	-	-	-	-	2	89	<1	-
Penicillium/Aspergillus group	5	222	6	-	-	-	-	-
Pithomyces	1	44	1	1/1	1	44	<1	-
Smuts,Periconia,Myxomycetes	3	133	4	1/3	8	356	2	-
	Debris Rating **3**				Debris Rating **3**			
Analytical Sensitivity	Analytical Sensitivity: **11** spr/m³				Analytical Sensitivity: **11** spr/m³			
Comments								
Total *See Footnotes	78	3467	~100%	1/5	423	18800	~100%	-

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Project ID: 18038677

Footnotes and Additional Report Information

Debris Rating Table

1	Minimal (<5%) particulate present	Reported values are minimally affected by particulate load.
2	5% to 25% of the trace occluded with particulate	Negative bias is expected. The degree of bias increases directly with the percent of the trace that is occluded.
3	26% to 75% of the trace occluded with particulate	Negative bias is expected. The degree of bias increases directly with the percent of the trace that is occluded.
4	75% to 90% of the trace occluded with particulate	Negative bias is expected. The degree of bias increases directly with the percent of the trace that is occluded.
5	Greater than 90% of the trace occluded with particulate	Quantification not possible due to large negative bias. A new sample should be collected at a shorter time interval or other measures taken to reduce particulate load.

1. Penicillium/Aspergillus group spores are characterized by their small size, round to ovoid shape, being unicellular, and usually colorless to lightly pigmented. There are numerous genera of fungi whose spore morphology is similar to that of the Penicillium/Aspergillus type. Two common examples would be Paecilomyces and Acremonium. Although the majority of spores placed in this group are Penicillium, Aspergillus, or a combination of both. Keep in mind that these are not the only two possibilities.

2. Ascospores are sexually produced fungal spores formed within an ascus. An ascus is a sac-like structure designed to discharge the ascospores into the environment, e.g. Ascobolus.

3. Basidiospores are typically blown indoors from outdoors and rarely have an indoor source. However, in certain situations a high basidiospore count indoors may be indicative of a wood decay problem or wet soil.

4. The colorless group contains colorless spores which were unidentifiable to a specific genus. Examples of this group include Acremonium, Aphanocladium, Beauveria, Chrysosporium, Engyodontium microconidia, yeast, some arthrospores, as well as many others.

5. Hyphae are the vegetative mode of fungi. Hyphal elements are fragments of individual Hyphae. They can break apart and become airborne much like spores and are potentially allergenic. A mass of hyphal elements is termed the mycelium. Hyphae in high concentration may be indicative of colonization.

6. Dash (-) in this report, under raw count column means 'not detected (ND)'; otherwise 'not applicable' (NA).

7. The positive-hole correction factor is a statistical tool which calculates a probable count from the raw count, taking into consideration that multiple particles can impact on the same hole; for this reason the sum of the calculated counts may be less than the positive hole corrected total.

8. Due to rounding totals may not equal 100%.

9. Analytical Sensitivity for each spores is different for Non-viable sample when the spores are read at different percentage. Analytical Sensitivity is calculated as spr/m^3 divided by raw count. spr/m^3 = raw counts x (100/ % read) x (1000/Sample volume). If Analytical Sensitivity is 13 spr/m^3 at 100% read, Analytical Sensitivity at 50% read would be 27 spr/m^3, which is 2 times higher. Analytical Sensitivity provided on the report is based on an assumed 100% of the trace being analyzed.

10. Minimum Reporting Limits (MRL) for BULKS, DUSTS, SWABS, and WATER samples are a calculation based on the sample size and the dilution plate on which the organism was counted. Results are a compilation of counts taken from multiple dilutions and multiple medias. This means that every genus of fungi or bacteria recovered can be counted on the plate on which it is best represented.

11. If the final quantitative result is corrected for contamination based on the blank, the blank correction is stated in the sample comments section of the report.

12. The results in this report are related to this project and these samples only.

13. For samples with an air volume of < 100L, the number of significant figures in the result should be considered (2) two. For samples with air volumes between 100-999L, the number of significant figures in the result should considered (3) three. For example, a sample with a result of 55,443 spr/m^3 from a 75L sample using significant figures should be considered 55,000. The same result of 55,443 from a 150L sample using significant figures should be considered 55,400 spr/m^3.

14. If the In/Out ratio is greater than 100 times it is indicated >100/1, rather than showing the real value.

Terminology Used in Direct Exam Reporting

Conidiophores are a type of modified hyphae from which spores are born. When seen on a surface sample in moderate to numerous concentrations they may be indicative of fungal growth.

Suzanne S. Blevins, B.S., SM (ASCP)
Laboratory Director

Appendix B

Inspector Credentials

STATE OF NEW YORK DEPARTMENT OF LABOR
MOLD ASSESSOR

N.Y.S

BRIAN COLANDREA

EXPIRES: 03-20

CERT# MA01300