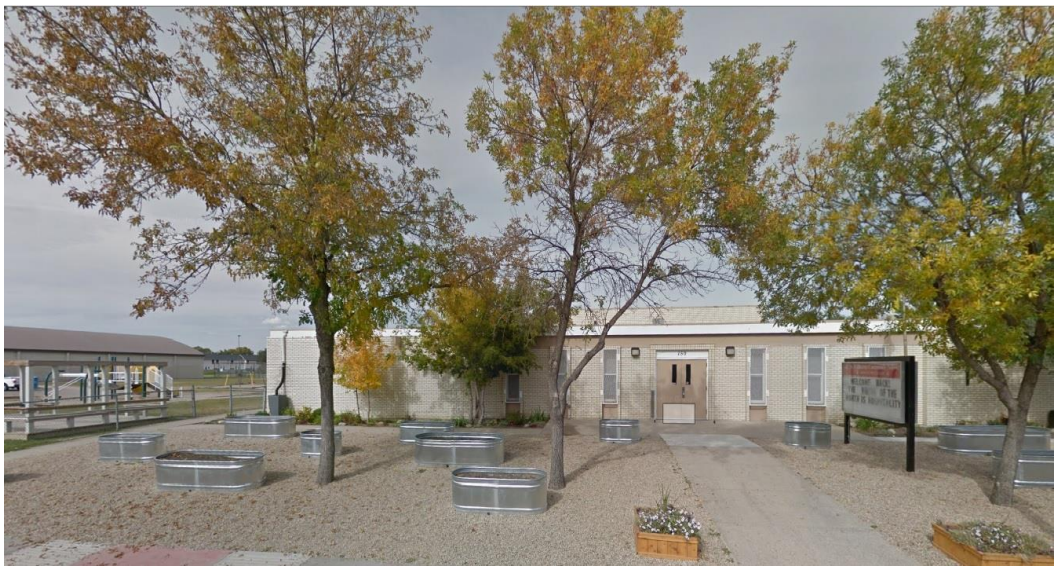
Bersch Consulting Ltd.



FUNGAL INVESTIGATION

St. Catherine Community School

150 Brotherton Avenue

Regina, SK

March 29, 2018

1124 – 5500 Mitchinson Way Regina, SK S4W 0N9
Office: (306) 533-8922 Fax: (306) 975-9665

Client: **Regina Catholic School Division**
2160 Cameron Street
Regina, SK
S4T 2V6

Attention: **Tyler Ottenbreit – Facilities Supervisor**

Location: **St. Catherine Community School**

Project No: **B85MRC29H – St. Catherine Community School Fungal Investigation**

Fungal Investigation

Bersch Consulting Ltd. was retained by the Regina Catholic School Division to conduct a fungal investigation within the Library and Portable Classroom of St. Catherine Community School located at 150 Brotherton Avenue in Regina, SK. Air sampling was performed on within the Library and Portable Classroom of the facility. The investigation was conducted to ensure there are no health concerns regarding mold/fungi resulting from previous roof leaks within the Library which has since been repaired. Air samples were collected in the following locations:

- Sample #1 – Library North-West (Shelving Unit on North Wall)
- Sample #2 – Library Main Desk
- Sample #3 – Portable Classroom 14

The samples were collected via Air-O-Cell cassette. Refer to **Appendix I** for the laboratory analysis. Based on the air samples collected, some form of remediation is warranted in the North-West corner of the Library. The levels of fungal spores identified in the remainder of the Library and Portable Classroom 14 are acceptable relative to current thresholds.

1.0 Methodology

1.1 Air Samples

Air samples were collected via Air-O-Cell cassette. This non-culturable method of sampling draws a measured volume of air through the cassette for a specified length of time. Particles in the air are impacted onto a coated glass slide within the cassette. The glass slide is analyzed by direct microscopic examination. This method allows for the collection of all spores (both viable and non-viable) and particulate matter in the air. The main advantage of this method is that it allows for the collection of both viable (living) and non-viable (dead) spores as both may cause adverse health effects in individuals. The main drawback is that differentiation between certain spore types is difficult or impossible, thus resulting in groupings of spores which have similar structures.

To date, there are no regulations regarding acceptable levels of airborne fungal spores indoors. However, the general industry standard when conducting air monitoring for airborne fungal spores is that the genus of fungi found indoors should be like the genus of fungi found outdoors with indoor levels lower than those found outdoors.

Although no regulations exist, a few general industry standards exist with regards to spore concentrations in air samples via Air-O-Cell Cassette method. The following industry standards have been adopted from EMSL Analytical Inc. Microbiological Laboratory in Mississauga, ON. to distinguish between spore concentration levels.

A. The total spore concentration level for an indoor air sample should be below 2000 spores/m^3 if the spore types identified are different from those identified in the outdoor reference sample. Indoor air sample concentrations may be above 2000 spores/m^3 only if the outdoor reference sample is above this threshold level.
B. The total concentration of Aspergillus/Penicillium spores should be below 1000 Spores/m^3 if the spore types identified are different from those identified in the outdoor reference sample. Indoor air sample concentrations may be above 1000 spores/m^3 only if the outdoor reference sample is above this threshold level.
C. The presence of Stachybotrys, Chaetomium, Trichoderma, Aureobasidium and Actinomycetes spores may suggest that some form of remediation is required.

In total, three (3) air samples were collected and forwarded to EMSL Analytical Inc. Microbiology Department in Mississauga, Ontario for analysis. Please refer to **Appendix I** for the Laboratory Analysis Report.

2.0 Laboratory Results

2.1 Sample Results

Various genera of fungi were identified in the air samples collected March 7, 2018. The samples were collected within St. Catherine Community School located at 150 Brotherton Avenue in Regina, SK. The following is a brief outline of the fungal investigation results. Interpretation of these results are based on the industry standards outlined in **Section 1.1** of this report. For a more detailed description of the fungi identified in the air samples, please refer to **Section 2.2** of this report. All fungal concentrations were recorded as a spore count per unit volume (total fungi spores/m^3).

A. With the exception of Sample #1, the total spore concentration of the remaining samples collected recorded spore levels **below** the 2000 spores/m^3 threshold level. Therefore, **no concerns** were noted regarding total spore concentration (other than Sample #1). The following are the results of the air samples collected on March 7, 2018:
    - Sample #1 – Library North-West - **5980 total fungi spore/m^3**
    - Sample #2 – Library Main Desk - **630 total fungi spore/m^3**
    - Sample #3 – Portable Classroom 14 - **390 total fungi spore/m^3**

B. With the exception of Sample #1, the total concentrations of Aspergillus/Penicillium spores within the remaining samples were **below** the industry standard of 1000 spores/m^3. There are **no concerns** regarding Aspergillus/Penicillium spore concentration (other than Sample #1). The following are the results of the air samples collected on March 7, 2018:
    - Sample #1 – Library North-West - **5610 total fungi spore/m^3**
    - Sample #2 – Library Main Desk - **590 total fungi spore/m^3**
    - Sample #3 – Portable Classroom 14 - **300 total fungi spore/m^3**

C. The total concentration of Cladosporium spores were recorded **within** the acceptable range of the outside reference threshold. Therefore, there are **no concerns** regarding total Cladosporium spore concentration. The following are the results of the air samples collected on March 7, 2018:
    - Sample #1 – Library North-West - **300 total fungi spore/m^3**
    - Sample #2 – Library Main Desk - **40 total fungi spore/m^3**
    - Sample #3 – Portable Classroom 14 - **80 total fungi spore/m^3**

D. Remediation requiring fungi were **no**t identified in any of the samples.

Refer to **Appendix I** for the Laboratory Analytical results.

2.2 Fungal Classification

Fungi in buildings may cause symptoms of allergies (wheezing, chest tightness, shortness of breath, nasal congestion, and eye irritation), especially in persons who have a history of allergic diseases (such as asthma and rhinitis). Except in widespread fungal contamination that is linked to illnesses throughout a building, building-wide evacuation is not necessary. Trace levels of fungi are present almost everywhere in the indoor and outdoor environments.

The following is a brief description of the fungi identified within the air samples collected from the rooms and outdoor reference under investigation.

Alternaria is a ubiquitous (found everywhere) fungus with approximately forty (40) to fifty (50) known species. Alternaria is commonly found on plants (living and decaying), soil and is usually found in indoor and outdoor air. Alternaria is commonly found in house dust, carpets and textiles and is one of the main fungal causes of allergy. Spores may cause nasal infections and alternaria has been associated with hypersensitivity pneumonitis.

Aspergillus: Is a genus of fungi with over one hundred (100) known species. Some species are considered opportunistic pathogens and may cause respiratory infections. Some species also produce mycotoxins and have been implicated in causing allergic reactions and hypersensitivity pneumonitis. Aspergillus species are some of the first fungi to grow on water damaged building materials and are frequently found in water damaged structures. The Air-O-Cell cassette method of sampling does not allow for the differentiation of Aspergillus and Penicillium spores therefore these spore types are combined into one grouping.

Cladosporium: Is also a ubiquitous fungus with approximately 30 to 40 known species. Cladosporium is one of the most common fungal spores identified in air samples. Cladosporium is also found in many soil types as well as on plants and plant decay.

Penicillium: Species have been shown to be common indoors even in clean environments. The presence of Penicillium species is usually accompanied by a strong musty odor. Penicillium is one of the first species fungi to grow on water damaged building materials and has been implicated in causing allergic reactions and hypersensitivity pneumonitis. The Air-O-Cell cassette method of sampling does not allow for the differentiation of Aspergillus and Penicillium spores therefore these spore types are combined into one grouping.

Pithomyces is mainly found growing on decaying plants, namely grasses. Reported cases of facial eczema have been reported following exposure to this fungus.

Stemphilium is a ubiquitous fungus with approximately six (6) known species. Stemphilium is a known Type I allergen (hay fever, asthma) with symptoms similar to exposure to Alternaria. Growth of this fungus indoors is uncommon. Stemphilium is isolated from dead plants and cellulose-based materials.

Unidentifiable spores may be fragments of spores or fungal structures that do not sporulate following incubation. In either case, identification of the spore is not possible.

3.0 Visual Inspection

A visual inspection of North-West corner of the Library was conducted during the site visit. Visible signs of fungal growth were observed behind the book shelves extending along the North wall from the NW corner of the Library. Further remediation is recommended in this area of the Library.

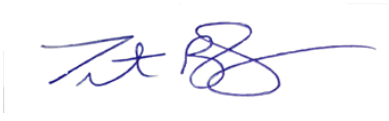
4.0 Conclusion / Recommendations

The fungal investigation conducted on March 7 concluded there is a requirement for further remediation within the North-West corner of the Library. It is recommended that the first section of shelving located along the North wall, extending from the North-West corner, be removed. Once the shelving has been removed, the wall surface shall be inspected to determine if the surface discolouration extends beyond the exposed wall portion. If discolouration extends beyond this point, the next shelving section shall be removed. This shall continue until all discolouration has been exposed. Once the discoloured portion of the North wall has been exposed, the entire North wall surface shall be cleaned and disinfected with a bleach solution (10% recommended). Caution shall be taken to thoroughly dry the area following the disinfecting process so as to prevent further fungal growth.

Persons involved in the disinfection process shall be equipped with proper personal protective equipment to prevent exposure to fungal spores. Half-face respirators equipped with HEPA cartridges are recommended along with disposable coveralls and impermeable gloves. Some form of eye protection is also recommended. There is no requirement to have an outside abatement contractor complete the clean-up. The clean-up is low risk and may be completed by division maintenance staff.

If you require further information or have questions regarding this information and results, please contact Trent Blaus of Bersch Consulting Ltd. We would like to thank you for this opportunity to serve your organization.

Regards,



Trent Blaus
Bersch Consulting Ltd.
B85MRC29H – St. Catherine Community School

5.0 References

1. The New York City Department of Health and Mental Hygiene. (2005). Guidelines on Assessment and Remediation of Fungi in Indoor Environments. Fungi in indoor environments: Environment and Occupational Disease Epidemiology: NYC DOHM
2. MidAtlantic Environmental Hygiene Resource Center. (2001). "Investigating, Sampling, Identifying and Assessing Biological and Microbiological Contamination in the Indoor Environment."
3. MidAtlantic Environmental Hygiene Resource Center. (2001). "Developing, Remediation Strategy and Writing Specifications for a Building Mold Remediation Project."

Appendix I

EMSL Canada Inc.

2756 Slough Street Mississauga, ON L4T 1G3
Phone: 289-997-4602 Fax: (289) 997-4607 Web: http://www.EMSL.com Email: torontolab@emsl.com

Attn: Trent Bleus
Bersch Consulting Ltd
1124 - 5500 Mitchinson Way
Regina, SK S4N 6K5

EMSL Order: 551802873
Customer ID: 55BEAL80A
Collected: 3/07/2018
Received: 3/15/2018
Analyzed: 3/16/2018

Proj: B85-St.Catherine

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	551802873-0001			551802873-0002			551802873-0003		
Client Sample ID:	85-01			85-02			85-03		
Volume (L):	75			75			75		
Sample Location:	Library - Northwest			Library - Desk			Portable - Rm 14		
Spore Types	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total
Alternaria	1*	10*	0.2	-	-	-	1*	10*	2.6
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	133	5610	93.8	14	590	93.7	7	300	76.9
Basidiospores	-	-	-	-	-	-	-	-	-
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	8	300	5	1	40	6.3	2	80	20.5
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces	1	40	0.7	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	1*	10*	0.2	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Stemphylium	1*	10*	0.2	-	-	-	-	-	-
Total Fungi	**145**	**5980**	**100**	**15**	**630**	**100**	**10**	**390**	**100**
Hyphal Fragment	3	100	-	-	-	-	1*	10*	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Conidiophores of Asperg	1	40	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	3	-	-	3	-	-	3	-
Fibrous Particulate (1-4)	-	2	-	-	2	-	-	2	-
Background (1-5)	-	3	-	-	3	-	-	3	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum
Myxomycetes++ = Myxomycetes/Periconia/Smut

No discernable field blank was submitted with this group of samples.

S.H. Panchal
Sneha Panchal, M.Sc.,RMCCM Laboratory Manager

High levels of background particulate can obscure spores and other particulates, leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. * Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Initial report from: 03/19/2018 19:53:06