



The Scott Lawson Group, Ltd.  
Environmental, Health & Safety Consultants

March 20, 2014

Mr. Peter Barbuto, Director of Maintenance  
School Administrative Unit No. 15  
Hooksett School District  
90 Farmer Road  
Hooksett, New Hampshire 03106

Re: Background Air Sampling – Auburn Village School, New Modular Classrooms  
*SLGL* File Number 14-2779

Dear Mr. Barbuto:

On March 5, 2014, at the request of School Administrative Unit No. 15 (SAU #15), *The Scott Lawson Group, Ltd. (SLGL)* performed background air sampling at the Auburn Village School located at 11 Eaton Road in Auburn, New Hampshire. The background sampling was requested to document current ambient conditions in the new Modular Classrooms as part of SAU #15's on-going review of facility issues that may impact indoor air quality.

The sampling was in response to recent roof leaks and subsequent roof repairs. The New Modular Classroom building was installed recently to replace an older Modular Unit with structural deficiencies, and houses Classrooms P-1 and P-2. On the day of the survey, there were no signs of microbial growth, and there were minimal areas of past water damage present. The school was in normal operations and occupied at the time of the sampling.

*SLGL* collected ambient air samples for airborne fungal spores in Classrooms P-1 and P-2, with an analytical field blank and outdoor air sample collected for quality control purposes. To help evaluate indoor air quality, direct-reading instruments were used to collect spot readings for Carbon monoxide (CO), Carbon dioxide (CO<sub>2</sub>), temperature, Relative Humidity (RH), and taking surface moisture measurements.

*Observations:*

At the time of the Survey, it appeared that mechanical ventilation systems were operating as designed. No visible microbial growth was observed on accessible interior walls, ceilings, or floors, during the IAQ Survey. There was however, visible evidence of past water infiltration or leaks at some ceiling locations, that were being repaired.

*Moisture Levels:*

Utilizing a GE Protimeter Moisture Level Meter, moisture levels were collected from wall and ceiling surfaces. Surface and probe sampling to a depth of one-half inch (1/2") for moisture was conducted with no readings being collected that indicated any existing moisture levels in building materials above normal. This suggests that the moisture content of these materials is not conducive to fungal growth.

The following section summarize's the analytical results obtained during the sampling at Auburn Village School.

*Air Samples - Total Spore Counts with Predominant Genus Identification:*

Fungus spores are found in ambient air most times of the year, from spring through fall, with numbers declining in the winter months. The term "genus" refers to the particular "family" of Fungi, and there are individual species within each genus. All Fungi are considered to be potentially allergenic.

Each sample was collected by drawing air through an Air-O-Cell® sampling cassette at a flow rate of approximately fifteen (15) liters per minute for five (5) minutes.

Analysis of the Air-O-Cell® cassettes (with count and identification by Predominant Genus) was used to determine total airborne viable and non-viable Fungi spores. Sampling equipment was calibrated prior to and following sampling. Upon completion of each sample, the cassette was sealed, issued a unique sample identification number, and its location documented.

**Table I– Air Sample Results for Total Fungal Spores**

<b>New Modular Classrooms Sampling Location</b>	<b>Predominant Fungi Concentrations (Ct/m3)</b>	<b>Predominant Genus</b>	<b>Total Fungal Spores and Fragments</b>
Classroom P-1	160 107 107	<i>hyphal fragments, Aspergillus/Penicillium- like and Cladosporium</i>	374
Classroom P-2	107 107	<i>Aspergillus/Penicillium- like and Basidisporos</i>	320
Exterior, Ramp to Modular	373 107	<i>Cladosporium, and hyphal fragments</i>	480

Analysis of the spore trap samples reveal that the indoor fungal spore concentrations within the sampled area(s) do not indicate a recognized health concern to the occupants. Analysis of the samples indicate that airborne Fungi levels are within normal/background levels for this time of the year.

*Carbon dioxide:*

Studies indicate that CO<sub>2</sub> is an excellent surrogate indicator of indoor air quality. Since CO<sub>2</sub> is given off by humans when exhaling, its levels in the air provide a good indication of the quality of air circulation and how effectively the ventilation system, if present, is diluting and removing pollutants from the air. It must be noted that it is (generally) not necessarily the concentration of CO<sub>2</sub> itself that is of concern in this type of setting, but rather it is the levels of CO<sub>2</sub> exceeding 1,000 parts per million (1,000 ppm), which are indicative of inadequate fresh/outdoor air introduction -- or under-ventilation.

- CO<sub>2</sub> levels in Classroom P-1 and P-2 ranged from 751 ppm to 908 ppm.

*Relative Humidity and Temperature:*

For an environment in which occupants are engaged in light, primarily sedentary activity, the most recent American National Standards Institute/American Society of Heating, Refrigerating and Air Conditioning Engineers (ANSI/ASHRAE) standard recommends that RH be controlled to a range of thirty to sixty percent (30% to 60%). These are the upper and lower limits based on considerations of dry skin, eye irritation, respiratory health, microbial growth, and moisture-related phenomena.

The ANSI/ASHRAE standard ventilation recommends that an optimum winter operative temperature of 71 degrees Fahrenheit (71°F) be maintained, with a comfort range of 68°F to 75°F. During the summer, it is recommended that an optimum operative temperature of 76°F be maintained, with a comfort range of 73°F to 79°F.

The temperature should be set toward the lower end in the winter when people wear heavier clothing, and toward the upper end in the summer when people wear lighter clothing. (Measurements were made using a TSI Q-TRAK, a direct-reading instrument.)

- Ambient room temperatures measured 69°F to 73°F, with an RH of 19% - 25%.

*Carbon monoxide:*

CO is not a natural component of indoor air, and is considered an indoor air pollutant. Overexposure to CO can deprive the body of Oxygen-carrying hemoglobin, and cause immediate or chronic health effects to those individuals exposed to elevated levels.

- No CO was detected in any of the sampled areas.

Air sampling results indicate that fungal spore concentrations in the selected areas are generally low, and do not represent a significant concern to building occupants. CO<sub>2</sub> levels were within recommended levels, based on current use. *Relative Humidity levels were on the low side as typical during drier winter months.*

Based on the sampling results and observations while on-site, *SLGL* makes the following general recommendations:

1. In accordance with Federal and State of New Hampshire rules, provide employees with access to air monitoring data and the requisite record keeping be performed.
2. Should building occupants complain of upper respiratory irritation/dryness, they should be encouraged to hydrate themselves, use saline nasal spray, and hand creams.
3. Continue to monitor the environment for potential air quality issues. For example, where water has leaked onto ceiling tiles, ensure leaks or damages are repaired in a timely manner.

As Fungi are ubiquitous in our environment, we should not expect surfaces/air to be free of spores, which can be introduced into the building on footwear, clothing, open windows/doors, roof leaks/water infiltration, and ventilation systems.

However, microbial growth indoors is not normal, and should be handled properly. The general approach is to determine the source of moisture/water intrusion and then abate the growth. Spore trap sampling reveals that the indoor fungal spore concentrations within the sampled area(s) do not indicate a recognized health concern to the occupants. The sampling results indicate the overall concentration of Fungi indoors versus outdoors, are where they should be.

Thank you for utilizing the services of *The Scott Lawson Group, Ltd.* We enjoyed working with you and welcome the opportunity to work with you on future projects. We trust that you will find everything in order; however, should you have any questions or comments, please feel free to contact me at your earliest convenience.

Sincerely,

*The Scott Lawson Group, Ltd.*

A handwritten signature in black ink, appearing to read "Stephen McPherson". The signature is fluid and cursive, with a long horizontal line extending to the right.

Stephen McPherson  
Senior Safety & Health Professional  
Member Indoor Air Quality Association (#17501)  
Associated Member ACGIH (305730-00)

Enclosures

## **WARRANTY**

The conclusions and recommendations contained in this report are based on information available to *SLGL* as of March 5, 2014. *SLGL* provides no warranties on information provided by third parties and contained herein. Data compiled were in accordance with *SLGL's* approved scope of services and should not be construed beyond their limitations. Any interpretations or use of this report other than those expressed herein are not warranted. The use, partial use, or duplication of this report without the expressed written consent of *The Scott Lawson Group, Ltd.*, is strictly prohibited.

## **APPENDIX A**

### **ANALYTICAL RESULTS**



Analytical Results

Lab Number:	313083	313084	313085
Sample Identification:	030514-2779-A01, Area, Classroom #P-1	030514-2779-A02, Area, Classroom #P-2	030514-2779-A03, Area, exterior, on covered ramp to Modular
Analysis:	Fungi Enumeration & Identification - Direct Examination	Fungi Enumeration & Identification - Direct Examination	Fungi Enumeration & Identification - Direct Examination
Methodology:	SLGL-3067	SLGL-3067	SLGL-3067
Sample Media:	Air-O-Cell	Air-O-Cell	Air-O-Cell
Debris Rating:	3	3	2
Air Volume (L):	75.0	75.0	75.0
Minutes:	5	5	5
Date Analyzed:	March 10, 2014	March 10, 2014	March 10, 2014

Mold/Fungi Type	Raw Count	Count/m <sup>3</sup>	Raw Count	Count/m <sup>3</sup>	Raw Count	Count/m <sup>3</sup>
<i>Alternaria</i>						
Ascospores						
** <i>Aspergillus/Penicillium</i> -like	2	107	2	107		
Basidiospores			2	107		
<i>Bipolaris Drechslera</i> -like						
<i>Bonytis</i>						
<i>Chaetomium</i>						
<i>Cladosporium</i>	2	107	1	53	7	373
<i>Coryularia</i>						
<i>Epicoccum</i>						
<i>Fusarium</i>						
Myxomycetes/ <i>Periconia</i> /smuts						
<i>Nigrospora</i>						
<i>Oidium/Erysiphe/Peronospora</i>						
<i>Phoma</i>						
<i>Pithomyces</i>						
rusts						
<i>Spegazzinia</i>						
<i>Stachybotrys</i>						
<i>Stemphylium</i>						
<i>Torula</i>						
<i>Ulocladium</i>						
unknown/unidentified						
hyphal fragments	3	160	1	53	2	107
Total fungal spores and fragments:	7	373	6	320	9	480
Limit of Detection:	1	53	1	53	1	53
Comments:						

TNTC: Too numerous to count

<: Less Than

>: Greater Than

Count/m<sup>3</sup>: Count per meter cubed

PAACB: Pan-American Acrobiology Certification Board

Detection Limit: The detection limit is equal to one fungal spore or hyphal fragment

\*\* *Aspergillus* and *Penicillium* spores (and others such as *Poecilomyces*) are small and round with few distinguishing characteristics. They cannot be distinguished by this method.

\*: No analytical field blank submitted with associated sample(s).

Background Debris: Background debris is an indication of the amount of non-microbial debris present on the slide and is rated on a scale of 1 to 5:

Debris Load of 1: <10% debris present. Counts not affected.

Debris Load of 2: 11-25% debris present. Counts not affected.

Debris Load of 3: 25-75% debris present. Counts may be underestimated.

Debris Load of 4: 76-90% debris present. Counts underestimated.

Debris Load of 5: >90% debris present. Counts could not be determined. Sample overloaded.

Helen H. Green

Norman E. Fletcher

Reviewed by: \_\_\_\_\_

Approved By: \_\_\_\_\_

Norman Fletcher, Lab Manager



The Scott Lawson Group, Ltd.

Environmental, Health & Safety Consultants

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(603) 228-3610 / (800) 645-7674 / Fax (603) 228-3871

Client: SAU #15

90 Farmer Road

Hooksett, NH 03106

SLGL Job #: 14-2779

Client Project: Auburn Village, New Modular Classrooms

Report Date: March 10, 2014

Date Sampled: March 5, 2014

Date Received: March 6, 2014

Collected by: SMC

Analyzed by: NEF, #01040036



Analytical Results

Table with 4 columns: Lab Number, Sample Identification, Analysis, Methodology, Sample Media, Debris Rating, Air Volume (L), Minutes, Date Analyzed.

Table with 6 columns: Mold/Fungi Type, Raw Count, Count/m³, and four empty columns.

TNTC: Too numerous to count

<: Less Than

>: Greater Than

Count/m3: Count per meter cubed

PAACB: Pan-American Aerobiology Certification Board

Detection Limit: The detection limit is equal to one fungal spore or hyphal fragment.

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Debris Load of 5: >90% debris present. Counts could not be determined, sample overloaded.

Reviewed by: Helen H. Brewer

Approved By: Norman E. Fletcher

Norman Fletcher, Lab Manager





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Submitting Co.: **SALIS**

14-2779

Client Project: **Auburn Village  
New Modular Classroom**

SLGL Job #:

Turnaround Time  
(select one)

- 3 hours\*     6-8 hours\*     24 hours\*     48 hours\*     72 hours\*  
 5 days     10 days     Weekend     Other: \_\_\_\_\_

\*Not available for all tests. Schedule rush and weekend tests in advance.

Sample Matrix Type  
(select one)

- Air     Bulk     Soil  
 Aqueous     Oil     Solid  
 Agar (biostrip)     Paint     Swab  
 Agar (plate)     Sludge     Tape Lift

Comments:

- Water, drinking or waste  
 Wipe  
 Wipe composite  
 Other: \_\_\_\_\_

Attention:

Sampled By: **GMC**

Phone:

Fax:

email:

All samples on this form should be of the SAME matrix type. Use additional forms as needed.

Samples received in good condition?     Yes     No

SLGL Lab #	Sample Identification	Analysis	Date Sampled	Time	Media/ Container	Preservative	4°C	Swab/Wipe Area Units:	Air Volume (L)	Minutes
33083	030514-2779-A01	Sponge CA	3/5	-	Are-O-Gel	-	-		75	5
084	802		†	†	†	-	-		75	5
085	803		†	†	†	-	-		75	5
086	— A04	—	-	-	-	-	-		0	0

Sample Collection and Custody Information

Samples Shipped Via:  FedEx     UPS     DHL     US Mail     Drop Box     Drop Off     Other

Relinquished By:

*[Signature]*

Date/Time:

3-6-14 0800

Date/Time:

3/6/14 830 AM

Relinquished By:

Date/Time:

Received By:

*[Signature]*

Date/Time:

Note to Customer: by signing and relinquishing your samples to the laboratory, you agree with the terms and conditions found on the back of this Chain of Custody Form.