



## Environmental Resources Group

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November 20, 2024

Brian Lieber  
Director of Operations  
Okemos Public Schools  
4406 Okemos Road  
Okemos, Michigan

**RE: Bioaerosol Sampling, Okemos Public Schools  
Kinawa Middle School, Okemos, Michigan  
ERG Project No.: 240440**

Dear Mr. Lieber:

Environmental Resources Group, LLC. (ERG) is pleased to provide the following report of findings. On November 17, 2024, ERG staff conducted mold in air sampling within the Kinawa Middle School (KMS), Rooms 105, 107 and 109, following remediation of mold on the roof deck materials completed by GFL Environmental. As part of the testing, a visual inspection was conducted and no visible mold was found in the work areas. Bioaerosol samples were then collected using Air-O-Cell cassettes, tubing, and a high-volume vacuum pump. All bioaerosol (air) samples were submitted to and analyzed in the ERG Indoor Air Quality Laboratory pursuant to the requirements of ASTM International Standard D-7391.

### **INTERPRETATION OF DATA**

#### **Fungal Spores**

Indoor airborne spore concentrations in “clean” commercial buildings generally total less than 2,650 s/m<sup>3</sup>. *Aspergillus/Penicillium* together comprise less than 750 s/m<sup>3</sup> and spores of the groups Ascospores and Basidiospores generally make up less than 1,000 s/m<sup>3</sup>. The total of all other spores should not exceed 900 s/m<sup>3</sup> (Baxter, Journal of Occupational Environmental Hygiene, January 2005). In addition, highly allergenic spores (i.e. – *Pithomyces*, *Stemphyllium*, *Stachybotrys*) should not be present in a statistically significant number (a raw count of 10 or more spores).

Additionally, an out-of-doors sample was collected as a point of comparison.

The bioaerosol air samples from all locations sampled within KMS were indicative of “clean” conditions and were below the limits established as the Baxter Criteria. Additionally, indoor spore concentrations were of a similar assemblage to outdoors, but at much lower concentrations, further suggesting that indoor spore concentrations were indicative of “clean” conditions.



## **Pollen and Other Particulate**

Indoor airborne pollen concentrations in “clean” air-conditioned buildings are generally below 30 s/m<sup>3</sup>. Individuals with pollen allergy may exhibit symptoms when pollen concentrations exceed approximately 50 s/m<sup>3</sup>, especially when grass or highly allergenic ragweed pollen are present. Pollen was not detected in the collected air samples.

Organic fibers such as cellulose (paper fibers) may be present in “clean” buildings in the range of 0 to 10,000 s/m<sup>3</sup>. These fibers are not known to cause illness or allergy at these levels, but might suggest inadequate housekeeping or poor ventilation, among other things. Cellulose concentrations were within the normal range (0 to 10,000 s/m<sup>3</sup>) in the collected air samples.

Inorganic fibers such as mineral wool or fiberglass (fibrous glass) may create dermal irritation when present in concentrations exceeding 1,000 s/m<sup>3</sup>. Fibrous glass was not detected in the collected air samples.

Synthetic fibers include polyester and Dacron and do not generally exceed 1,000 s/m<sup>3</sup>. The presence of elevated synthetic fiber concentrations suggests degrading synthetic fiber surfaces (clothing, carpet, upholstered furniture) and/or the need for improved housekeeping. Synthetic fibers were not detected above the desired 1,000 s/m<sup>3</sup> threshold in the collected air samples.

Mineral fibers, such as gypsum, generally do not exceed 1,000 s/m<sup>3</sup>. Their presence may be indicative of uncontrolled renovation or demolition. Mineral fibers were not detected in the collected air samples.

Opaque particles, including soot, fly ash, binders, copy toner, etc., generally do not exceed 5,000 s/m<sup>3</sup>. When indoor concentrations exceed 10,000 s/m<sup>3</sup>, attempts to identify the source of the particles and reduce their number should be made. The opaque particle concentrations did not exceed the 5,000 s/m<sup>3</sup> threshold in any collected air sample.

Insect fragments, including antennae, legs, wings, etc., should not be observed in “clean” indoor environments. Detectable quantities of insect fragments, including excrement, may cause allergic reactions in sensitive individuals and suggests the existence of current or past infestation or poor housekeeping. Insect fragments were not detected in the collected air samples.

## **Conclusions**

Based on the results of testing, the following conclusions were drawn:

- The bioaerosol (air) samples collected in Rooms 105, 107, 109 were indicative of “clean” conditions, were below the Baxter Criteria, and were below outdoor spore concentrations.



**Recommendations**

Based on the conclusions above the following recommendation is offered:

1. The areas are safe to occupy following the removal of plastic sheeting, air filtration devices and the replacement of ceiling tile.

Sincerely,

**ENVIRONMENTAL RESOURCES GROUP**

A handwritten signature in blue ink, appearing to read "Kristin Peterson", is written over a light yellow rectangular background.

Kristin Peterson  
Senior Industrial Hygienist

Enclosures



PROJECT NUMBER 240440      DATE 11/17/2024

PROJECT Kinawa Middle School, Okemos, MI

SAMPLED BY Kristin Peterson

CLIENT Okemos Public Schools

ANALYZED BY ERG

**AIR SAMPLE DATA SHEET**

SAMPLE #	TYPE	DESCRIPTION	TIME ON TIME OFF	SAMPLE TIME (MIN)	FLOW ON FLOW OFF (L/MIN)	AVERAGE FLOW	VOLUME (LITERS)	Results
1	BA	Room 105 near center of the room	11:29	5	15.8	15.8	79	See attached data sheets
			11:34		15.8			
2	BA	Field Blank						See attached data sheets
3	BA	10' from door in Room 107	11:36	5	15.8	15.8	79	See attached data sheets
			11:41		15.8			
4	BA	Room 109 near center of the room	11:43	5	15.8	15.8	79	See attached data sheets
			11:48		15.8			
5	BA	Hallway between Room 109 and 110	11:49	5	15.8	15.8	79	See attached data sheets
			11:54		15.8			
6	BA	Out of doors side of the building	12:00	5	15.8	15.8	79	See attached data sheets
			12:05		15.8			

SAMPLE TYPES: FB - FIELD BLANK  
 B - BULK  
 MV - MICROVACUUM  
 V - VARIOUS  
 BA-BIOAEROSOL







**Comments**

\*Debris rating (% obstructed by particulate matter ): 0= no particulate matter detected, 1= >0-5%, 2= 6%-25%, 3= 26%-76%, 4= 75%-90%, 5= >90%. Where debris rating =5, fungal/pollen/other particulate are reported as "present." For debris ratings 2-4, negative bias is expected. The degree of negative bias increases with the percent of the trace that is obstructed.

Samples were received in acceptable condition, unless otherwise indicated. Results relate only to items tested. Results are reported in units of structures per cubic meter of air (s/m<sup>3</sup>), except blank samples, where the actual number of observed particles are reported. Spore types listed without a count or other data indicate that the specific analyte was not detected during the course of sample analysis. Spores of the genera *Aspergillus* and *Penicillium* are categorized together due to their small size and spherical shape with few distinguishing characteristics. Other similar spores will be categorized as *Aspergillus/Penicillium* unless fruiting bodies allow more precise identifications.

ND= none detected (minimum of 20.3% trace scanned) unless otherwise reported .

Minimum Reporting Limit represents the lowest calculated limit in this report.

This report shall not be reproduced, except in full, without written approval of the laboratory.

Flow Rate is in liters per minute. Time is reported in minutes.

The enclosed data from Environmental Resources Group, LLC (ERG) is for sample(s) collected by our client. The client bears all risk relative to the use of this data, including any course of action or inaction. Further, ERG asserts that the data pertains only to the submitted sample(s). ERG makes no representation or guarantee about the source of the material analyzed, the suitability of the sample size, sample frequency or sample distribution, or the relationship of the submitted sample(s) to the area sampled.

Approved Signatory: \_\_\_\_\_ 

Date: 11/18/2024

