Environmental Resources Group
3125 Sovereign Drive • Suite B • Lansing, MI • 48911
Phone: 517-999-6020• Fax: 248-924-3108

November 6, 2024

Brian Lieber
Facility Director
Okemos Public Schools
4000 Okemos Road
Okemos, Michigan 48864

RE: Bioaerosol Sampling, Rooms 111-114
Kinawa Middle School, 1900 Kinawa Drive, 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 2 and again on November 5, 2024, ERG staff conducted mold in air testing within Rooms 111 – 114 at Kinawa Middle School. All bioaerosol samples were collected using Air-O-Cell cassettes, tubing, and a high-volume vacuum pump. The air flow from the air sample pump was adjusted using a calibrated flow meter. All bioaerosol (air) samples were submitted to and analyzed in the ERG Indoor Air Quality Laboratory pursuant to the requirements of modified ASTM International Standard D-7391. Copies of the IAQ Bioaerosol Analytical Reports are attached for your records.

INTERPRETATION OF DATA

Fungal Spores

Indoor airborne spore concentrations in "clean" commercial buildings generally total less than 2,650 s/ m^3. *Aspergillus*/*Penicillium* together comprise less than 750 s/m^3 and together, the spores of the groups Ascospores and Basidiospores generally make up less than 1,000 s/m^3. The total of all other spores should not exceed 900 s/m^3 (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 an additional point of comparison.

The bioaerosol air samples from Rooms 111-114 on November 2 were not indicative of clean conditions. This may have been the result of the presence of mold on asbestos containing material known to exist behind the vinyl cladding on wallpaper in the rooms. That material was sealed, the rooms recleaned and HEPA filter equipped Air Filtration Devices (AFDs) were allowed to operate in most of the rooms

overnight. Resampling was performed early in the morning of November 5, 2024, and in all of Rooms 111-114, the air samples were indicative of "clean" conditions and were below the limits established as the Baxter Criteria. Additionally, no highly allergenic spores were detected and indoor spore concentrations were much lower than outdoor 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/m³. Individuals with pollen allergy may exhibit symptoms when pollen concentrations exceed approximately 50 s/m³, 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^3. 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^3) 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^3. Fibrous glass was not detected in the collected air samples.

Synthetic fibers include polyester and Dacron and do not generally exceed 1,000 s/m³. 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 threshold.

Mineral fibers, such as gypsum, generally do not exceed 1,000 s/m^3. 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^3. When indoor concentrations exceed 10,000 s/m^3, 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^3 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 on November 2 were not indicative of clean conditions.
- Sealing of drywall vinyl, cleaning and air filtration were conducted on November 4 by GFL Environmental.
- The results of follow up testing on November 5, 2024 in Rooms 111-114 were indicative of "clean" conditions, were devoid of highly allergenic spores, were below the Baxter Criteria and were below outdoor spore concentrations.
- The rooms may be safely occupied.

Recommendations

Based on the above conclusions no recommendations are offered.

Should you have any questions or need additional information feel free to contact us.

Sincerely,

ENVIRONMENTAL RESOURCES GROUP

Phillip A. Peterson
Senior Project Manager

Enc

PROJECT NUMBER 240440 DATE 11/2/2024

PROJECT Kinawa Middle School 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	Near wall 20' from entry to Room 114	14:23 14:28	5	15.8 15.8	15.8	79	See attached data sheets
2	FB	Field Blank						See attached data sheets
3	BA	Hallway off Room 113	14:30 14:35	5	15.8 15.8	15.8	79	See attached data sheets
4	BA	Room 113 , 10' from small office	14:37 14:42	5	15.8 15.8	15.8	79	See attached data sheets
5	BA	Room 112, 5' from interior wall	14:50 14:55	5	15.8 15.8	15.8	79	See attached data sheets
6	BA	Room 111, 10' from windows	15:01 15:06	5	15.8 15.8	15.8	79	See attached data sheets
7	BA	Out of doors side of the building	15:11 15:16	5	15.8 15.8	15.8	79	See attached data sheets

SAMPLE TYPES:

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

IAQ Bioaerosol Analytical Report

ERG Project Number: 240440-11-2

Client Name: Okemos Public Schools

Project Name: Kinawa Middle School, Rooms 111-114

Date of Sample Collection: 11/2/2024
Date of Submittal: 11/2/2024
Date of Analysis: 11/2/2024

Report Date: 11/2/2024
Analyst: Phillip A. Peterson
Minimum Reporting Limit: 60 s/m³

Sample #	1			2			4		
Sample Location	Room 114			Field Blank			Room 113		
Spores	structures/ sample	s/m³	% trace scanned	structures/ sample	s/m³	% trace scanned	structures/ sample	s/m³	% trace scanned
Alternaria	ND			ND			54	680	20.3%
Ascospore	ND			ND			ND		
Aspergillus/Penicillium	596	7500	20.3%	ND			217	2700	20.3%
Basidiospore	5	60	20.3%	ND			5	60	20.3%
Botrytis	ND			ND			ND		
Chaetomium	49	610	20.3%	ND			15	200	20.3%
Cladosporium	5	60	20.3%	ND			ND		
Curvularia	ND			ND			ND		
Drechslera/Bipolaris	ND			ND			ND		
Epicoccum	ND			ND			ND		
Erysiphae/Oidium	ND			ND			ND		
Fusarium	ND			ND			ND		
Hyphal Fragments	15	200	20.3%	ND			ND		
Nigrospora	ND			ND			ND		
Periconia/ Myxomycete/Smut	ND			ND			ND		
Ulocladium/Pithomyces	15	200	20.3%	ND			ND		
Rhizopus	ND			ND			ND		
Stachybotrys	20	300	20.3%	ND			ND		
Stemphyllium	ND			ND			ND		
Torula	ND			ND			ND		
Miscellaneous/Unidentified Spores	ND			ND			182	2300	20.3%
Total	705	8930		ND			473	5940	
Pollen									
Grass	ND			ND			ND		
Tree	ND			ND			ND		
Other/Unknown Pollen	ND			ND			ND		
Total	ND			ND			ND		
Other Particulate									
Cellulose Fibers	54	680	20.3%	ND			44	600	20.3%
Fibrous Glass	ND			ND			ND		
Synthetic Fibers	ND			ND			ND		
Mineral Fibers	ND			ND			ND		
Opaque Particles	30	400	20.3%	ND			15	200	20.3%
Insect Fragments	ND			ND			ND		
Total	84	1080		ND			59	800	
*Debris rating	1			0			1		

Notes:

All samples prepared and analyzed per the modified ASTM D7391-09.

IAQ Bioaerosol Analytical Report

ERG Project Number: 240440-11-2

Client Name: Okemos Public Schools

Project Name: Kinawa Middle School, Rooms 111-114

Date of Sample Collection: 11/2/2024
Date of Submittal: 11/2/2024
Date of Analysis: 11/2/2024

Report Date: 11/2/2024
Analyst: Phillip A. Peterson
Minimum Reporting Limit: 60 s/m³

Sample #	5			6			7		
Sample Location	Room 112			Room 111			Out-of-doors		
Spores	structures/ sample	s/m³	% trace scanned	structures/ sample	s/m³	% trace scanned	structures/ sample	s/m³	% trace scanned
Alternaria	10	100	20.3%	ND			15	200	20.3%
Ascospore	69	860	20.3%	25	300	20.3%	30	400	20.3%
Aspergillus/Penicillium	483	6000	20.3%	207	2600	20.3%	251	3100	20.3%
Basidiospore	5	60	20.3%	ND			ND		
Botrytis	ND			ND			ND		
Chaetomium	ND			ND			ND		
Cladosporium	25	300	20.3%	15	200	20.3%	25	300	20.3%
Curvularia	ND			ND			ND		
Drechslera/Bipolaris	ND			ND			ND		
Epicoccum	ND			ND			ND		
Erysiphae/Oidium	ND			ND			ND		
Fusarium	ND			ND			ND		
Hyphal Fragments	ND			ND			ND		
Nigrospora	ND			ND			ND		
Periconia/ Myxomycete/Smut	10	100	20.3%	ND			30	400	20.3%
Ulocladium/Pithomyces	ND			ND			ND		
Rhizopus	ND			ND			ND		
Stachybotrys	ND			ND			ND		
Stemphyllium	ND			ND			ND		
Torula	ND			ND			ND		
Miscellaneous/Unidentified Spores	552	6900	20.3%	89	1100	20.3%	ND		
Total	1154	14320		336	4200		351	4400	
Pollen									
Grass	5	60	20.3%	ND			ND		
Tree	ND			ND			ND		
Other/Unknown Pollen	ND			ND			ND		
Total	5	60		ND			ND		
Other Particulate									
Cellulose Fibers	34	400	20.3%	84	1100	20.3%	5	60	20.3%
Fibrous Glass	ND			ND			ND		
Synthetic Fibers	ND			15	200	20.3%	10	100	20.3%
Mineral Fibers	ND			ND			ND		
Opaque Particles	15	200	20.3%	30	400	20.3%	10	100	20.3%
Insect Fragments	ND			ND			5	60	20.3%
Total	49	600		129	1700		30	320	
*Debris rating	1			1			1		

Notes:

All samples prepared and analyzed per the modified ASTM D7391-09.

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/m³), 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.

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 on behalf of 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 industry appropriate care and consideration were exercised in the collection of these samples, including the manner, number, and distribution of collected samples.

Approved Signatory: 

Date: 11/2/2024

PROJECT NUMBER 240440 DATE 11/5/2024

PROJECT Kinawa Middle School SAMPLED BY ERG - Phil Peterson

CLIENT Okemos Public School 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 114	6:37 6:42	5	15.9 15.9	15.9	79.5	See attached data sheets
2	BA	Room 113	6:44 6:49	5	15.9 15.9	15.9	79.5	See attached data sheets
3	BA	Room 112	6:53 6:58	5	15.9 15.9	15.9	79.5	See attached data sheets
4	BA	Room 111	7:00 7:05	5	15.9 15.9	15.9	79.5	See attached data sheets
5	BA	Field blank	7:03 -	0				See attached data sheets
6	BA	Out-of-doors outside Room 104	7:11 7:16	5	15.9 15.9	15.9	79.5	See attached data sheets

SAMPLE TYPES: CO - CARBON MONOXIDE
CO_2 - CARBON DIOXIDE
O_2 - OXYGEN
H_2S - HYDROGEN SULFIDE
T - TEMPERATURE
RH - RELATIVE HUMIDITY
FB - FIELD BLANK
B - BULK
MV - MICROVACUUM
V - VARIOUS
BA-BIOAEROSOL
IH - INDUSTRIAL HYGIENE

IAQ Bioaerosol Analytical Report

ERG Project Number: 240440

Client Name: Okemos Public Schools

Project Name: Kinawa Middle School

Date of Sample Collection: 11/5/2024
Date of Submittal: 11/5/2024
Date of Analysis: 11/5/2024

Report Date: 11/5/2024
Analyst: Kaila Schwanitz
Minimum Reporting Limit: 60 s/m³

Sample #	1			2			3		
Sample Location	Room 114			Room 113			Room 112		
Spores	structures/ sample	s/m³	% trace scanned	structures/ sample	s/m³	% trace scanned	structures/ sample	s/m³	% trace scanned
Alternaria	ND			ND			ND		
Ascospore	34	400	20.3%	30	400	20.3%	5	60	20.3%
Aspergillus/Penicillium	ND			ND			15	200	20.3%
Basidiospore	ND			ND			ND		
Botrytis	ND			ND			ND		
Chaetomium	ND			ND			ND		
Cladosporium	ND			ND			ND		
Curvularia	ND			ND			ND		
Drechslera/Bipolaris	ND			ND			ND		
Epicoccum	ND			ND			ND		
Erysiphae/Oidium	ND			ND			ND		
Fusarium	ND			ND			ND		
Hyphal Fragments	ND			ND			ND		
Nigrospora	ND			ND			ND		
Periconia/ Myxomycete/Smut	ND			ND			ND		
Ulocladium/Pithomyces	ND			ND			ND		
Rhizopus	ND			ND			ND		
Stachybotrys	ND			ND			ND		
Stemphyllium	ND			ND			ND		
Torula	ND			ND			ND		
Miscellaneous/Unidentified Spores	ND			ND			ND		
Total	34	400		30	400		20	260	
Pollen									
Grass	ND			ND			ND		
Tree	ND			ND			ND		
Other/Unknown Pollen	ND			ND			ND		
Total	ND			ND			ND		
Other Particulate									
Cellulose Fibers	5	60	20.3%	5	60	20.3%	10	100	20.3%
Fibrous Glass	ND			ND			ND		
Synthetic Fibers	15	200	20.3%	5	60	20.3%	15	200	20.3%
Mineral Fibers	ND			ND			ND		
Opaque Particles	79	990	20.3%	30	400	20.3%	44	600	20.3%
Insect Fragments	ND			ND			ND		
Total	99	1250		40	520		69	900	
*Debris rating	1			1			1		

Notes:

All samples prepared and analyzed per the modified ASTM D7391-09.

IAQ Bioaerosol Analytical Report
ERG Project Number: 240440

Client Name: Okemos Public Schools
Project Name: Kinawa Middle School

Date of Sample Collection: 11/5/2024
Date of Submittal: 11/5/2024
Date of Analysis: 11/5/2024
Report Date: 11/5/2024
Analyst: Kaila Schwanitz
Minimum Reporting Limit: 60 s/m³

Sample #	4			5			6		
Sample Location	Room 111			Field Blank			Out-of-doors		
Spores	structures/ sample	s/m³	% trace scanned	structures/ sample	s/m³	% trace scanned	structures/ sample	s/m³	% trace scanned
Alternaria	ND			ND			ND		
Ascospore	10	100	20.3%	ND			148	1900	20.3%
Aspergillus/Penicillium	5	60	20.3%	ND			25	300	20.3%
Basidiospore	ND			ND			ND		
Botrytis	ND			ND			ND		
Chaetomium	ND			ND			ND		
Cladosporium	ND			ND			330	4100	20.3%
Curvularia	ND			ND			ND		
Drechslera/Bipolaris	ND			ND			ND		
Epicoccum	ND			ND			ND		
Erysiphae/Oidium	ND			ND			ND		
Fusarium	ND			ND			ND		
Hyphal Fragments	ND			ND			ND		
Nigrospora	ND			ND			5	60	20.3%
Periconia/ Myxomycete/Smut	ND			ND			ND		
Ulocladium/Pithomyces	ND			ND			ND		
Rhizopus	ND			ND			ND		
Stachybotrys	ND			ND			ND		
Stemphyllium	ND			ND			ND		
Torula	ND			ND			ND		
Miscellaneous/Unidentified Spores	ND			ND			ND		
Total	15	160		ND			508	6360	
Pollen									
Grass	ND			ND			ND		
Tree	ND			ND			ND		
Other/Unknown Pollen	ND			ND			ND		
Total	ND			ND			ND		
Other Particulate									
Cellulose Fibers	5	60	20.3%	ND			5	60	20.3%
Fibrous Glass	ND			ND			ND		
Synthetic Fibers	25	300	20.3%	5		20.3%	ND		
Mineral Fibers	ND			ND			ND		
Opaque Particles	69	860	20.3%	10		20.3%	34	400	20.3%
Insect Fragments	ND			ND			ND		
Total	99	1220		15			39	460	
*Debris rating	1			1			1		

Notes:

All samples prepared and analyzed per the modified ASTM D7391-09.

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/m³), 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.

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: 11/5/2024

ERG Environmental Resources Group
3125 Sovereign Drive • Suite B • Lansing, MI 48911
Phone: 517-999-6020 • Fax 248-924-3108

Client Name: Okemos Public Schools
Contact Person: Phil @ ERG
Project Name/ Number: Kinawa M.S.
Project Location: Okemos, MI 240440
Email Distribution List:
Phone No.:
Purchase Order No.:

Date	Time	Sample #	Client Sample Descriptor	MATRIX (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	Mold in air by ASTM D7391 or equiv.	HOLD SAMPLE	Remarks
11/05/24	see	1	Room 114	A	1	✓		
↓	ASDS	2	Room 113	A	1	✓		
↓	↓	3	Room 112	A	1	✓		
↓	↓	4	Room 111	A	1	✓		
↓	↓	5	Field blank	A	1	✓		
↓	↓	6	Out-of-doors	A	1	✓		

Matrix Code

S	Soil	GW	Ground Water
A	Air	SW	Surface Water
O	Oil	W	Wastewater
B	Bulks	X	Other: Specify

Comments:

Samples received in acceptable condition ☑

Sampled/Relinquished By: [signature]	Date/ Time 11/05/24 07:56	Received By:
Relinquished By:	Date/ Time	Received By:
Relinquished By:	Date/ Time	Received By Laboratory: [signature]

Turnaround Time ALL RESULTS WILL BE SENT BY THE END OF THE BUSINESS DAY

____ Same day ____ 1 bus. day ____ 2 bus. days ____ 3 bus. days ____ 4 bus. days

____ 5-7 bus. days (standard) Other (specify time/date requirement): ASAP, please

LAB USE ONLY
ERG project number:
Temperature upon receipt at Lab (If applicable):

Please see back for terms and conditions