



Environmental Resources Group

Assessment • Remediation • Compliance • Risk Management

INDOOR AIR QUALITY EVALUATION REPORT



**KINAWA MIDDLE SCHOOL
1900 KINAWA DRIVE
OKEMOS, MICHIGAN 48864**

PREPARED FOR:

**OKEMOS PUBLIC SCHOOLS
4000 OKEMOS ROAD
OKEMOS, MICHIGAN 48864
ATTENTION: MR. BRIAN LIEBER**

PREPARED BY:

**ENVIRONMENTAL RESOURCES GROUP, LLC
3125 SOVEREIGN DRIVE, SUITE 9B
LANSING, MICHIGAN 48911**

ERG PROJECT NO.: 240440

PROJECT DATE: AUGUST 26, 2024

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1.0 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Environmental Resources Group, LLC (ERG) was retained by Okemos Public Schools to conduct an Indoor Air Quality Evaluation within select 200 Wing classrooms at Kinawa Middle School, 1900 Kinawa Drive, Okemos, Michigan. The specific tasks of the evaluation were as follows:

- Conduct visual and olfactory observations in select 200 Wing classrooms where visible mold had been reported on wooden cabinets.
- Conduct sampling for carbon dioxide, oxygen, carbon monoxide, lower explosive limit (LEL) and hydrogen sulfide and conduct measurements of temperature and relative humidity within select 200 Wing Classrooms.
- Conduct bioaerosol (air) and settle dust (micro vacuum) sampling for mold, pollen and other particulate using Zefon Air-O-Cell cassettes in select 200 wing classrooms.
- Conduct tape lift sampling for mold using IMS Tape Lift Samplers in select 200 Wing Classrooms.
- Collect digital photographs of current conditions.

Kristin and Phillip A. Peterson conducted the evaluation on August 26, 2024, to determine current indoor air quality conditions in the classrooms following the observance of visible mold.

1.2 BACKGROUND INFORMATION

The school is a single story structure of steel and masonry construction that was built slab on grade. No service tunnels exist below the structure. The air the 200 Wing is supplied by a ducted supply and ducted return air handling system. The air handling unit is in the basement Air Handling Room.

Evaluation Equipment and Methods

Kristin and Phillip A. Peterson, trained investigators with over 25 and 35 years of environmental experience respectively, made visual and olfactory observations and collected samples.

Carbon dioxide measurements were made using a TSI IAQCalc Carbon Dioxide Meter. The meter was allowed to equilibrate for five minutes prior to the collection of data from the instrument. The instrument was used pursuant to the manufacturer's recommendations.

Oxygen, carbon monoxide, LEL and hydrogen sulfide concentrations were measured using an RKI Instruments Inc., Model GX-2009 four gas meter. The instrument was allowed to equilibrate for five

minutes prior to the collection of data from the instrument. The four-gas meter was used pursuant to the manufacturer's recommendations.

Temperature and relative humidity measurements were made using a Protmex, Model MS6508, digital temperature humidity meter. This instrument was allowed to equilibrate for 5 minutes prior to the collection of data from the instrument. The instrument was used pursuant to the manufacturer's recommendations.

Bioaerosol (air) and settled dust (micro vacuum) samples were collected using Zefon Air-O-Cell cassettes, tubing, and a high-volume vacuum pump. All bioaerosol and settled dust samples were collected pursuant to the manufacturer's recommendations. Collected samples were submitted to and analyzed in the ERG Indoor Air Quality Laboratory pursuant to the requirements of modified ASTM International Standard D7391-09.

The tape lift samples were collected using IMS Tape Lift Samplers. The tape lift samples were also submitted to and analyzed in the ERG Indoor Air Quality Laboratory pursuant to the requirements of the aforementioned test method.

Digital photographs were collected using a digital camera.

2.0 VISUAL AND OLFACTORY OBSERVATIONS

During the ERG evaluation, visual and olfactory observations were made by the inspectors. A summary of observations in the building follows:

Basement Air Handling Room

- No musty, earthy or other odors were observed immediately upon entry.
- More than 100 square feet of visible mold was observed on pipe insulation throughout the room.
- Standing water was present on the floor between the air handlers and in the back right corner of the room. The floor drain appeared to be working properly.
- Water was leaking out of the base of the left side air handling unit.
- The floor was concrete.
- The air intake grilles were clean and unobstructed.
- Air filters could be seen behind the air intake louvers.
- Condensation was present on the outside surface of some pipe insulation.
- Valves and pipe were visibly rusted.
- Several small nicks and gouges were observed in the pipe insulation.
- Several feet of pipe insulation (located between the air handlers) was significantly damaged.
- The overall level of dust was moderate.

Large Basement Storage Room

- A faint musty odor was observed immediately upon entry.
- More than 200 square feet of visible mold was observed on the walls in the room.
- The base of the wall near the exit doors was stained black.
- The floor was concrete.
- The supply air grilles were clean and unobstructed.
- The return air grilles were clean and unobstructed.
- Air in the room felt stagnant.
- The overall level of dust was moderate.

Room 219

- No musty or earthy odors were observed immediately upon entry.
- The odor of air freshener was observed upon entry.
- No water marks or stains were observed in the classroom.
- A plug-in air freshener was observed (it was unplugged by the investigators in hopes they could make observations without the olfactory distraction of the air freshener).
- Between less than 1 and 15 square feet of white, visible mold was observed on the underside of each of the classroom tables.
- Visible mold was observed on the cloth covers on the tackboards.

- The wooden cabinet had approximately 8 square feet of visible mold on its outside surface. No mold was observed inside the cabinet.
- Visible mold was observed behind papers taped to the cabinet.
- A very faint musty odor was observed in the center of the classroom.
- The carpet held an unpleasant and difficult to characterize odor.
- Select portions of the drop ceiling tile grid were rusted.
- Select corner beads had rust bleeding through the paint.
- The supply air diffusers appeared clean.
- The return air grilles appeared clean.
- The floor was carpeted.
- Drop ceiling tile were bowed (as occurs following exposure to high humidity conditions).
- The overall level of dust was low.

Kiva

- A faint musty odor was observed immediately upon entry.
- No water marks or stains were observed in the classroom.
- No plug-in air freshener was observed.
- No tables were present in the room.
- Select portions of the drop ceiling tile grid were rusted.
- Select corner beads had rust bleeding through the paint.
- The supply air diffusers were dirty.
- The return air grilles appeared clean.
- The floor was partially carpeted with the remaining sections covered in floor tile.
- Drop ceiling tile were bowed.
- The overall level of dust was low.

Room 215

- A faint smells of both mold and body odor were observed immediately upon entry.
- Between less than 1 and 3 square feet of white, visible mold was observed on the underside of each classroom table.
- Select portions of the drop ceiling tile grid were rusted.
- Select corner beads had rust bleeding through the paint.
- The supply air diffusers appeared clean.
- The return air grilles appeared clean.
- The floor was carpeted.
- Drop ceiling tile were bowed.
- The overall level of dust was low.

Room 210- Mrs. I-O

- The faint smell of body odor was observed immediately upon entry.

- The odor of air freshener was observed upon entry.
- No water marks or stains were observed in the classroom.
- A diffusive air freshener was observed.
- Between less than 1 and 6 square feet of white, visible mold was observed on the underside of nearly every classroom table.
- Visible mold was observed on the cloth covers on the tackboards/bulletin boards.
- Approximately 5 square feet of visible mold was present on the outside of the wooden cabinet.
- Approximately 2 square feet of visible mold was present on the rear classroom door.
- A DREO air filtration device was present and in operation in the classroom.
- The supply air diffusers appeared clean.
- The return air grilles appeared clean.
- The floor was carpeted.
- Drop ceiling tile were bowed.
- The overall level of dust was low.

Room 211 (Mrs. Smith)

- No musty or earthy odors were observed immediately upon entry.
- An herbal odor was observed upon entry.
- A diffusive air freshener was observed.
- Between less than 1 and 15 square feet of white, visible mold was observed on the underside of most classroom tables.
- Select portions of the drop ceiling tile grid were rusted.
- Select corner beads had rust bleeding through the paint.
- The supply air diffusers appeared clean.
- The return air grilles appeared clean.
- The floor was carpeted.
- Drop ceiling tile were not bowed in this classroom.
- A dehumidifier was plugged in and operational.
- An air filtration device was present and operational.
- The overall level of dust was low.

Room 210

- No musty or earthy odors were observed immediately upon entry.
- A distinctive, sharp smell was observed upon entry.
- Between 1 and 15 square feet of white, visible mold was observed on the underside of most of the classroom tables.
- Visible mold was present on some fabric tackboard covers.
- Select portions of the drop ceiling tile grid were rusted.
- Select corner beads had rust bleeding through the paint.

- The supply air diffusers appeared clean.
- The return air grilles appeared clean.
- The floor was carpeted.
- Drop ceiling tile were not bowed in this classroom.
- The overall level of dust was low.

Room 307-Science

- No musty or earthy odors were observed immediately upon entry.
- Approximately 7 square feet of visible mold was observed on the wooden cabinet.
- Between 1 and 5 square feet of white, visible mold was observed on the underside of laboratory benches and tables.
- Visible mold was present on some fabric tackboard covers.
- The drop ceiling tile grid were not rusted.
- Select corner beads had rust bleeding through the paint.
- The supply air diffusers appeared clean.
- The return air grilles appeared clean.
- The floor was tiled.
- Drop ceiling tile were not bowed in this classroom.
- The overall level of dust was low.

Out-of-doors

- Temperature was hot, skies were partly cloudy with a southwest breeze/wind.
- No unusual, moldy or other odors were observed outdoors.
- The grounds were well maintained.
- At the start of the evaluation, heavy vehicular traffic was observed. At the completion of the evaluation light vehicular traffic was observed.
- At the start of the evaluation, heavy pedestrian traffic was observed. At the completion of the evaluation only light pedestrian traffic was observed.

3.0 RESULTS OF TESTING

All samples were collected by Kristin or Phillip A. Peterson. During sampling, the building was occupied by the investigator and a small number of building staff. No students were observed.

A log with sample description information and the results of bioaerosol (air) and other sample data appear in Appendix A and are summarized below.

Indoor carbon dioxide was measured between 668 and 882 parts per million (ppm). Carbon dioxide was measured at 323 ppm out-of-doors.

Oxygen was recorded at 20.9 percent at all indoor and out-of-doors locations.

Carbon monoxide was not detected indoors or out-of-doors.

LEL was not detected indoors or out-of-doors.

Hydrogen sulfide was not detected indoors or out-of-doors.

Indoor temperature was recorded between 65.8 and 73.9 degrees Fahrenheit. Out-of-doors temperature was recorded at 90.5 degrees Fahrenheit.

Indoor relative humidity was recorded between 64.5 and 72.0 percent. Out-of-doors relative humidity was measured at 50.2 percent.

The results of indoor bioaerosol sample analysis indicated total airborne spore concentrations between 60 and 2,940 structures per cubic meter of air (s/m^3). Pollen was not detected indoors, and other particulate was recorded between 460 and 2,940 s/m^3 . The out-of-doors sample had a spore concentration of 6,600 s/m^3 , pollen was not detected, and other particulate was recorded at 2,260 s/m^3 . No highly allergenic spores were detected in any of the air samples.

The results of micro vacuum sample analysis indicate the presence of between less than 1 and 60% spores in the settled dust. In two of the three dust samples, a small fraction of the mold was highly allergenic *Pithomyces*.

Digital photographs appear in Appendix B.

4.0 CONCLUSIONS

Based upon reports by others, the visual and olfactory observations made by the investigators and the results of sample analysis, the following conclusions were drawn:

Test results were indicative of conditions at the time of the investigation and may not represent conditions at other times. No conclusions can be drawn regarding areas of the building which were not inspected.

4.1 DIRECT READ INSTRUMENT MEASUREMENTS

Carbon dioxide (CO₂, a colorless odorless gas that results from normal human respiration) concentrations were acceptable in the building and were below the limits established by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) in Voluntary Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality. The ASHRAE carbon dioxide recommended limit is 700 parts per million (ppm) above the out-of-doors concentration. The out-of-doors carbon dioxide concentration was 323 ppm, making CO₂ concentrations of 1023 ppm or less acceptable in this case. The data indicates that adequate fresh air ventilation was provided to the tested areas of the building.

Oxygen (O₂, a colorless, odorless gas necessary for human life that makes up approximately 20.9% of the atmosphere by volume) concentrations were within the acceptable range of 19.5 – 23.5% at all sampling locations.

Carbon monoxide (CO, a simple asphyxiant gas and possible source of headache) concentrations were acceptable in all indoor tested areas. In fact, carbon monoxide was not detected indoors or out-of-doors.

LEL (combustible gases and possible upper respiratory irritant) concentrations were acceptable in all tested areas. In fact, LEL was not detected indoors or out-of-doors.

Hydrogen sulfide (H₂S, a flammable, colorless, gas that smells like rotten eggs and which may cause upper respiratory irritation) concentrations were acceptable in all tested areas. In fact, hydrogen sulfide was not detected indoors or out-of-doors.

Indoor temperature readings were generally below the ASHRAE (Standard 55) recommended human comfort temperature range (73-79 degrees Fahrenheit) in all tested locations. No complaints of thermal discomfort were known and classrooms were not occupied by staff and students at the time of the evaluation.

Indoor relative humidity recorded during the inspection was generally above the limit (65%) recommended by ASHRAE (in voluntary standard 62.1-2007).

4.2 BIOAEROSOL SAMPLE RESULTS

Airborne mold concentrations in “clean” commercial buildings generally total 2,650 s/m³ or less with spores of the genera *Aspergillus* and/or *Penicillium* making up not more than 750 s/m³ and spores of the groups Ascospores and Basidiospores together making up not more than 900 s/m³. The total of all other spores should not exceed 1,000 s/m³ (Baxter, Journal of Occupational Environmental Hygiene, January 2005). Those limits are called the Baxter Criteria. Additionally, highly allergenic spores (i.e. – *Pithomyces*, *Stemphyllium*, *Stachybotrys*) should not be present in a statistically significant number (i.e. – a raw count of 10 or more spores). Airborne mold concentrations in the tested rooms at the times and locations of sampling were below the limits established as the Baxter Criteria and are indicative of “clean” conditions. Additionally, no highly allergenic mold was detected in the air samples.

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/m³. 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/m³) 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/m³. 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. The synthetic fiber concentration did not exceed the desired 1,000 s/m³ threshold.

Mineral fibers, such as gypsum, generally do not exceed 1,000 s/m³ and 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 should not exceed 5,000 s/m³. When indoor concentrations exceed 10,000 s/m³, 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/m³ 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.

In the experience of ERG, settled dust in buildings with no history of water loss or high humidity conditions contains approximately 1% mold. Mold spore concentrations in dust above 1% suggest the presence of moisture, uncontrolled condensation or high humidity conditions that allowed mold to grow. The dust sample from Room 216 was indicative of clean conditions. The dust samples from Room 215 and 219 had greater than 1% mold present and a small number of highly allergenic mold spores were detected in each of those two samples, not indicative of clean conditions.

This analytical technique cannot differentiate spores of the genus *Aspergillus/Penicillium*, among others, due to their similar morphology. Additionally, some mold, pollen, yeast, bacteria, arthropods, and other airborne constituents may be present, but are not identifiable by this technique.

Visible mold was detected in the inspected classrooms, the basement Air Handling Room and the large basement Storage Room.

Rusted ceiling tile grid, rusted corner beads, and bowed ceiling tile suggest sustained high humidity conditions, as does the presence of widespread mold

In spite of the presence of visible mold, the mold in air concentrations were within the limits established as the Baxter Criteria in all tested areas. Settled dust contained greater than 1% mold in two test locations. Other tested parameters (Carbon dioxide, oxygen, carbon monoxide, etc.) were within recommended limits, except for temperature which, during a period of low building occupancy, was below the recommended range. Lastly, relative humidity was above the ASHRAE recommended range in all but one tested location.

Air fresheners were observed in many of the inspected rooms. Air fresheners are known to liberate hundreds of different chemicals, even when the air freshener is labelled "green" or "organic". Among these chemicals are VOCs, some of which may be toxic or hazardous.

The above conclusions are based on the inspection results, observations made at the time of the inspection and information provided by others. Should new or revised information become available, ERG reserves the right to revise the report, modify or change the above conclusions and subsequent recommendations.

5.0 RECOMMENDATIONS

Based on the observations made by the investigator, the findings of this evaluation and the conclusions above, the following recommendation is offered:

1. Retain a State of Michigan licensed Asbestos Abatement Contractor to patch and repair or remove damaged pipe insulation in the basement Air Handling Room. A sign in the room indicates the insulation is asbestos containing material. Ensure that third party air monitoring is conducted and ensure the air handling units are turned off and the intake grilles sealed during the patch and repair or removal operations. Only after successful clearance testing may the intake grille be unsealed and the units made operational.
2. Retain a heating, ventilating and air conditioning (HVAC) expert to inspect the air handlers and their operational controls and programming to ensure they are operating at peak performance. Ensure a visual inspection is conducted to determine whether or not mold is present in the HVAC units. Retain professionals to conduct cleaning and sanitizing, if necessary.
3. Perform routine housekeeping activities, especially carpet vacuuming, with commercial vacuums equipped with HEPA filters (or equivalent).
4. Retain a mold remediation professional to clean visibly moldy surfaces in the large basement storage room. Ensure established guidelines (those from OSHA or New York City or the IICRC) are carefully followed by the contractor. Ensure the HVAC equipment serving this area is operating at peak performance.
5. Inspect the interior of the leaking AHU and execute necessary repairs (likely a plugged drain given the volume of water and location of the leak). Periodically inspect each unit to ensure their correct operation.
6. Permanently remove air fresheners from within Kinawa Middle School due to the potential for release of VOCs and potentially toxic and hazardous chemicals.
7. Allow mold trained OPS Operations staff or retain ERG to conduct an evaluation of mold conditions in every room in Kinawa Middle School.
8. Conduct periodic (perhaps monthly for an initial frequency) and more widespread mold in air testing.
9. Allow mold trained OPS Operations staff or retain ERG to develop a mold remediation protocol to clean each of the inspected rooms and those subsequently found to be moldy (if any).
10. Retain a State of Michigan licensed asbestos removal contractor to encapsulate or remove the mold covered asbestos containing pipe insulation in the basement Air Handling Room. Fans must be shut off and HVAC grilles sealed with polyethylene sheeting.
Asbestos removal brings with it a myriad of requirements including notification to the State of Michigan and requirements for specification development, third party air monitoring, visual inspection and final clearance air sampling (all of which ERG can provide).

11. If complaints persist, contact ERG to conduct additional evaluation which might include the collection of a more detailed building history, destructive testing, additional mold in air testing, and sampling for VOCs or microbiologically derived VOCs (MVOCs).

This evaluation was conducted consistent with sound investigative principles and current industry standards. Information in this report was provided by other than ERG. The accuracy or correctness of that information was not confirmed or verified by ERG. For additional information, please review the attached data or call ERG.



Kristin L. Peterson
Senior Industrial Hygienist



Phillip A. Peterson
Senior Project Manager

APPENDIX A

Air Sample Data Sheet and Laboratory Data



PROJECT NUMBER 240440 DATE 8/26/2024PROJECT Kinawa Middle SchoolSAMPLED BY ERG - Phillip & Kristin PetersonCLIENT Okemos Public SchoolsANALYZED 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							
								CO ₂	O ₂	LEL	CO	H ₂ S	T (° F)	RH (%)	Other
1	BA	Room 220 near desk	16:54	5	15.8										See attached data sheets
			16:59		15.8										
2	FB	Field blank													See attached data sheets
3	V	Room 219, on desk 15' from entry	16:57					882	20.9	0	0	0	71.6	66	See attached data sheets
4	BA	Room 219, near center	17:01	5	15.8	15.8									See attached data sheets
			17:06		15.8										
5	V	Room 215 on desk	17:04					785	20.9	0	0	0	68.1	72	See attached data sheets
6	MV	On carpet near black cabinet, Room 219	17:08												See attached data sheets
7	V	Hallway off 219	17:09												See attached data sheets
8	BA	Room 215 near center	17:23	5	15.8	15.8									See attached data sheets
			17:28		15.8										
9	V	Room 215 near center	17:30					741	20.9	0	0	0	68.5	69.8	See attached data sheets
10	MV	On carpet near TV stand, Room 215	17:29												See attached data sheets

SAMPLE TYPES:

- CO - CARBON MONOXIDE
- CO₂ - CARBON DIOXIDE
- O₂ - OXYGEN
- H₂S - HYDROGEN SULFIDE
- LEL - LOWER EXPLOSIVE LIMIT
- T - TEMPERATURE
- RH - RELATIVE HUMIDITY
- FB - FIELD BLANK
- B - BULK
- MV - MICROVACUUM
- BA - BIOAEROSOL
- V - VARIOUS



PROJECT NUMBER 240440 DATE 8/26/2024

PROJECT Kinawa Middle School

SAMPLED BY ERG - Phillip & 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							
								CO ₂	O ₂	LEL	CO	H ₂ S	T (° F)	RH (%)	Other
11	BA	5' from metal cabinet from 212	22:45	5	15.8										See attached data sheets
			17:39		15.8										
12	V	Room 212 on the table near the cabinets	17:37					710	20.9	0	0	0	68.5	72	See attached data sheets
13	BA	Room 112 near center	17:44	5											See attached data sheets
			17:49												
14	V	Room 211 on desk near door	17:45						20.9	0	0	0	70.1	66.5	See attached data sheets
15	BA	Room 210 near desk/bulletin board	17:53	5	15.8										See attached data sheets
			17:58		15.8										
16	V	Room 210 10' from entry on desk	17:54					668	20.9	0	0	0	68.5	70.1	See attached data sheets
17	MV	On carpet near teacher's desk, Room 210	18:00												See attached data sheets
18	V	Room 307 on sink 15' from entry													See attached data sheets
19	BA	Room 307 near teacher's desk	16:09	5				720	20.5	0	0	0	73.9	64.5	See attached data sheets
			16:14												
20	V	Out of doors near Door 2	16:19					323	20.9	0	0	0	90.5	50.2	See attached data sheets
21	BA	Out of doors - parking lot	16:21												See attached data sheets

SAMPLE TYPES: CO - CARBON MONOXIDE
 CO₂ - CARBON DIOXIDE
 O₂ - OXYGEN
 H₂S - HYDROGEN SULFIDE
 LEL - LOWER EXPLOSIVE LIMIT
 T - TEMPERATURE
 RH - RELATIVE HUMIDITY
 FB - FIELD BLANK
 B - BULK
 MV - MICROVACUUM
 BA - BIOAEROSOL
 V - VARIOUS



IAQ Bioaerosol Analytical Report

ERG Project Number: 240440

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

Date of Sample Collection: 8/27/2024 Report Date: 8/28/2024
Date of Submittal: 8/27/2024 Analyst: Kaila Schwanitz
Date of Analysis: 8/28/2024 Minimum Reporting Limit: 60 s/m³

Sample

Sample Location

Spores

Alternaria
Ascospore
Aspergillus/Penicillium
Basidiospore
Botrytis
Chaetomium
Cladosporium
Curvularia
Drechslera/Bipolaris
Epicoccum
Erysiphae/Oidium
Fusarium
 Hyphal Fragments
Nigrospora
Periconia/Myxomycete/Smut
Ulocladium/Pithomyces
 Rhizopus
Stachybotrys
Stemphylium
Torula
 Miscellaneous/Unidentified Spores
Total

	1			2			4		
	Room 220 near desk			Field Blank			Room 219 near center		
	structures/ sample	s/m ³	% trace scanned	structures/ sample	s/m ³	% trace scanned	structures/ sample	s/m ³	% trace scanned
<i>Alternaria</i>	ND			ND			ND		
<i>Ascospore</i>	5	60	20.3%	ND			10	100	20.3%
<i>Aspergillus/Penicillium</i>	ND			ND			ND		
<i>Basidiospore</i>	ND			ND			ND		
<i>Botrytis</i>	ND			ND			ND		
<i>Chaetomium</i>	ND			ND			ND		
<i>Cladosporium</i>	ND			ND			ND		
<i>Curvularia</i>	ND			ND			ND		
<i>Drechslera/Bipolaris</i>	ND			ND			ND		
<i>Epicoccum</i>	ND			ND			ND		
<i>Erysiphae/Oidium</i>	ND			ND			ND		
<i>Fusarium</i>	ND			ND			ND		
Hyphal Fragments	ND			ND			10	100	20.3%
<i>Nigrospora</i>	ND			ND			ND		
<i>Periconia/Myxomycete/Smut</i>	ND			ND			ND		
<i>Ulocladium/Pithomyces</i>	ND			ND			ND		
Rhizopus	ND			ND			ND		
<i>Stachybotrys</i>	ND			ND			ND		
<i>Stemphylium</i>	ND			ND			ND		
<i>Torula</i>	ND			ND			ND		
Miscellaneous/Unidentified Spores	ND			ND			ND		
Total	5	60		ND			20	200	

Pollen

Grass
 Tree
 Other/Unknown Pollen
Total

Grass	ND			ND			ND		
Tree	ND			ND			ND		
Other/Unknown Pollen	ND			ND			ND		
Total	ND			ND			ND		

Other Particulate

Cellulose Fibers
 Fibrous Glass
 Synthetic Fibers
 Mineral Fibers
 Opaque Particles
 Insect Fragments
Total
 *Debris rating

Cellulose Fibers	10	100	20.3%	ND			79	1000	20.3%
Fibrous Glass	ND			ND			ND		
Synthetic Fibers	5	60	20.3%	ND			54	680	20.3%
Mineral Fibers	ND			ND			ND		
Opaque Particles	25	300	20.3%	5		20.3%	133	1700	20.3%
Insect Fragments	ND			ND			ND		
Total	40	460		5			266	3380	
*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 School
Project Name: Kinawa Middle School

Date of Sample Collection: 8/27/2024 Report Date: 8/28/2024
 Date of Submittal: 8/27/2024 Analyst: Kaila Schwanitz
 Date of Analysis: 8/28/2024 Minimum Reporting Limit: 60 s/m³

Sample #**Sample Location****Spores**

Alternaria
 Ascospore
Aspergillus/Penicillium
 Basidiospore
Botrytis
Chaetomium
Cladosporium
Curvularia
Drechslera/Bipolaris
Epicoccum
Erysiphae/Oidium
Fusarium
 Hyphal Fragments
Nigrospora
Periconia/Myxomycete/Smut
Ulocladium/Pithomyces
 Rhizopus
Stachybotrys
Stemphylium
Torula
 Miscellaneous/Unidentified Spores
Total

8			11			13		
Room 215 near center			Room 212 5' from metal cabinet			Room 311 near center		
structures/ sample	s/m ³	% trace scanned	structures/ sample	s/m ³	% trace scanned	structures/ sample	s/m ³	% trace scanned
ND			ND			ND		
15	200	20.3%	10	100	20.3%	10	100	20.3%
49	620	20.3%	20	300	20.3%	20	300	20.3%
ND			ND			ND		
ND			ND			ND		
ND			ND			ND		
15	200	20.3%	10	100	20.3%	15	200	20.3%
ND			ND			ND		
ND			ND			ND		
ND			ND			ND		
ND			ND			ND		
ND			ND			ND		
ND			ND			ND		
5	60	20.3%	ND			ND		
ND			ND			ND		
ND			ND			ND		
ND			ND			ND		
ND			ND			ND		
ND			ND			ND		
ND			ND			ND		
ND			ND			ND		
84	1080		40	500		45	600	

Pollen

Grass
 Tree
 Other/Unknown Pollen
Total

ND			ND			ND		
ND			ND			ND		
ND			ND			ND		
ND			ND			ND		

Other Particulate

Cellulose Fibers
 Fibrous Glass
 Synthetic Fibers
 Mineral Fibers
 Opaque Particles
 Insect Fragments
Total

64	810	20.3%	20	300	20.3%	74	940	20.3%
ND			ND			ND		
39	500	20.3%	20	300	20.3%	20	300	20.3%
ND			ND			ND		
118	1500	20.3%	54	680	20.3%	138	1700	20.3%
ND			ND			ND		
221	2810		94	1280		232	2940	
1			1			1		

*Debris rating

Notes:

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



IAQ Bioaerosol Analytical Report

ERG Project Number: 240440

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

Date of Sample Collection: _____ 8/27/2024 Report Date: _____ 8/28/2024
Date of Submittal: _____ 8/27/2024 Analyst: _____ Kaila Schwanitz
Date of Analysis: _____ 8/28/2024 Minimum Reporting Limit: _____ 60 s/m³

Sample #

Sample Location

Spores

Alternaria
Ascospore
Aspergillus/Penicillium
Basidiospore
Botrytis
Chaetomium
Cladosporium
Curvularia
Drechslera/Bipolaris
Epicoccum
Erysiphae/Oidium
Fusarium
Hyphal Fragments
Nigrospora
Periconia/Myxomycete/Smut
Ulocladium/Pithomyces
Rhizopus
Stachybotrys
Stemphyllium
Torula
 Miscellaneous/Unidentified Spores
Total

	15			19			21		
Sample Location	Room 210 near desk and bulletin board			Room 307 on sink 15' from entry			Out-of-doors		
Spores	structures/ sample	s/m ³	% trace scanned	structures/ sample	s/m ³	% trace scanned	structures/ sample	s/m ³	% trace scanned
<i>Alternaria</i>	ND			ND			ND		
<i>Ascospore</i>	25	300	20.3%	5	60	20.3%	10	100	20.3%
<i>Aspergillus/Penicillium</i>	25	300	20.3%	30	400	20.3%	ND		
<i>Basidiospore</i>	ND			ND			ND		
<i>Botrytis</i>	ND			ND			ND		
<i>Chaetomium</i>	ND			ND			ND		
<i>Cladosporium</i>	15	200	20.3%	20	300	20.3%	517	6500	20.3%
<i>Curvularia</i>	ND			ND			ND		
<i>Drechslera/Bipolaris</i>	ND			ND			ND		
<i>Epicoccum</i>	ND			ND			ND		
<i>Erysiphae/Oidium</i>	ND			ND			ND		
<i>Fusarium</i>	ND			ND			ND		
<i>Hyphal Fragments</i>	ND			ND			ND		
<i>Nigrospora</i>	ND			ND			ND		
<i>Periconia/Myxomycete/Smut</i>	ND			ND			ND		
<i>Ulocladium/Pithomyces</i>	ND			ND			ND		
<i>Rhizopus</i>	ND			ND			ND		
<i>Stachybotrys</i>	ND			ND			ND		
<i>Stemphyllium</i>	ND			ND			ND		
<i>Torula</i>	ND			ND			ND		
Miscellaneous/Unidentified Spores	ND			ND			ND		
Total	65	800		55	760		527	6600	

Pollen

Grass
 Tree
 Other/Unknown Pollen
Total

Grass	ND			ND			ND		
Tree	ND			ND			ND		
Other/Unknown Pollen	ND			ND			ND		
Total	ND			ND			ND		

Other Particulate

Cellulose Fibers
 Fibrous Glass
 Synthetic Fibers
 Mineral Fibers
 Opaque Particles
 Insect Fragments
Total

Cellulose Fibers	25	300	20.3%	20	300	20.3%	39	500	20.3%
Fibrous Glass	ND			ND			ND		
Synthetic Fibers	25	300	20.3%	20	300	20.3%	5	60	20.3%
Mineral Fibers	ND			ND			ND		
Opaque Particles	34	400	20.3%	30	400	20.3%	133	1700	20.3%
Insect Fragments	ND			ND			ND		
Total	84	1000		70	1000		177	2260	
<i>*Debris rating</i>	1			1			1		

Notes:

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



IAQ Surface Sample Analytical Results
ERG Project Number: 240440

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

Date of Sample Collection: _____ 8/27/2024
 Date of Submittal: _____ 8/27/2024
 Date of Analysis: _____ 8/28/2024

Report Date: _____ 8/28/2024
 Analyst: _____ Kaila Schwanitz

Sample #	6	10	17
Sample Type	Microvacuum	Microvacuum	Microvacuum
Sample Location	Room 219 on carpet near black cabinet	Room 215 near TV stand	Room 216 on carpet near teachers desk
Spores, Pollen, and Other Particulate (In decreasing order of abundance)	<i>Aspergillus/Penicillium</i> Non Fibrous Matter Synthetic Fibers Opaque Particles Cellulose Fibers Hyphal Fragments <i>Pithomyces</i>	Non Fibrous Matter <i>Aspergillus/Penicillium</i> Synthetic Fibers Opaque Particles Cellulose Fibers <i>Pithomyces</i>	Non Fibrous Matter Synthetic Fibers Ascospore Opaque Particles Hyphal Fragments <i>Cladosporium</i> Pollen Cellulose Fibers <i>Aspergillus/Penicillium</i>
Notes:	This sample contains approximately 60% spores and related structures.	This sample contains approximately 5% spores.	This sample contains <1% spores and related structures.

Surface samples were analyzed pursuant to the requirements of the ASTM International Standard D-7391.



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.

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: _____ 

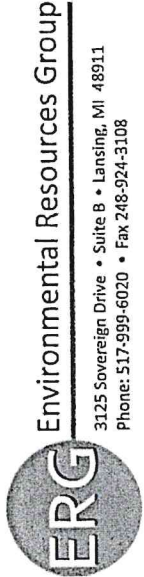
Date: 8/29/2024



Environmental Resources Group

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

Client Name: Okemos Public School		Matrix Code	
Contact Person: K. Peterson	S Soil		Ground Water
Project Name/ Number: 240440	A Air		Surface Water
Project Location: Karen Kinawa - M.S.	O Oil		Wastewater
Email Distribution List:	B Bulks		Other: Specify
Phone No.:	HOLD SAMPLE		
Purchase Order No.:	PARAMETERS		
Date	Time	Sample #	Client Sample Descriptor
8/27/24		-01	Room 220 Near desk
		-02	F. blank
		-04	Room 219 Near center
		-06	On carpet black cabinet Form 219
		-08	Room 215 Near center
		-10	On carpet Near to stand Room 215
		-11	5' long metal cabinet Room 219
		-13	Room 211 Near center
		-15	Room 210 Near desk bulletin board
		-17	On carpet near teacher's desk Room 216
Matrix (SEE RIGHT CORNER FOR CODE) # OF CONTAINERS			
Remarks:			
BA-79L 15.8 @ 5 min			
OL BA			
BA-79L			
MV			
BA-79L			
MV			
BA-79L			
BA-79L			
BA-79L			
MV			
Comments: <input checked="" type="checkbox"/> Samples received in acceptable condition			
Date/Time		Received By:	
8/27/24		Karen Kinawa	
Date/Time		Received By:	
Date/Time		Received By Laboratory:	
		LAB USE ONLY	
Turnaround Time		ERG project number: 240440/0001/0005	
1 bus. day		4 bus. days	
2 bus. days		Temperature upon receipt at Lab (if applicable):	
3 bus. days			
4 bus. days			
5-7 bus. days (standard)			
Other (specify time/date requirement):			
Please see back for terms and conditions			



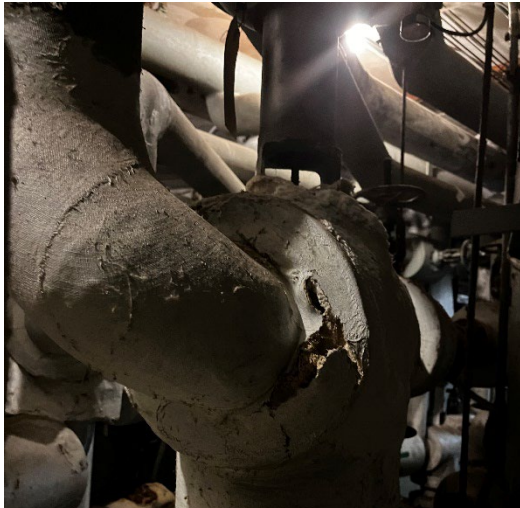


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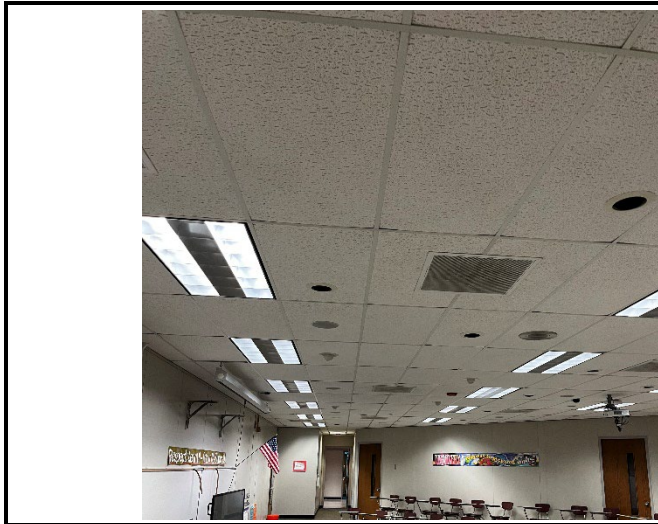
Client Name: Olkemus Public Schools		Matrix (SEE RIGHT CORNER FOR CODE)		# OF CONTAINERS		PARAMETERS		Matrix Code				
Contact Person: K. Peterson	Date: 8/27/24			Matrix Code: A	Matrix Code: 1	Matrix Code: X	Matrix Code: X	S Soil	GW	Ground Water		
Project Name/Number: 240440	Client Sample Descriptor: Room 307 ON SINK			Matrix Code: A	Matrix Code: 1	Matrix Code: X	Matrix Code: X	A Air	SW	Surface Water		
Project Location: Kinawa middle school	Date: 8/27/24			Matrix Code: A	Matrix Code: 1	Matrix Code: X	Matrix Code: X	O Oil	W	Wastewater		
Email Distribution List:	Date: 8/27/24			Matrix Code: A	Matrix Code: 1	Matrix Code: X	Matrix Code: X	B Bulks	X	Other: Specify		
Phone No.:	Client Sample Descriptor: out of doors near door 2			IAB		Remarks: BA-796 BA-797						
Purchase Order No.:	Date: 8/27/24			IAB		Remarks: BA-796 BA-797						
Date: 8/27/24	Time: 12:44	Sample #: 19	Client Sample Descriptor: Room 307 ON SINK	Matrix Code: A	Matrix Code: 1	Matrix Code: X	Matrix Code: X					
Date: 8/27/24	Time: 12:44	Sample #: 21	Client Sample Descriptor: out of doors near door 2	Matrix Code: A	Matrix Code: 1	Matrix Code: X	Matrix Code: X					
Comments: <input checked="" type="checkbox"/> Samples received in acceptable condition												
Sampled/Relinquished By: [Signature]		Date/Time: 8/27/24 @ 12:44		Received By:		Date/Time:		LAB USE ONLY				
Relinquished By: [Signature]		Date/Time:		Received By:		Date/Time:		ERG project number: 240440/0001/0005				
Relinquished By:		Date/Time:		Received By Laboratory:		Date/Time:		Temperature upon receipt at Lab (if applicable):				
Turnaround Time ALL RESULTS WILL BE SENT BY THE END OF THE BUSINESS DAY		1 bus. day		3 bus. days		4 bus. days						
Other (specify time/date requirement):		X 2 bus. days										
Please see back for terms and conditions												

APPENDIX B
Digital Photograph Log

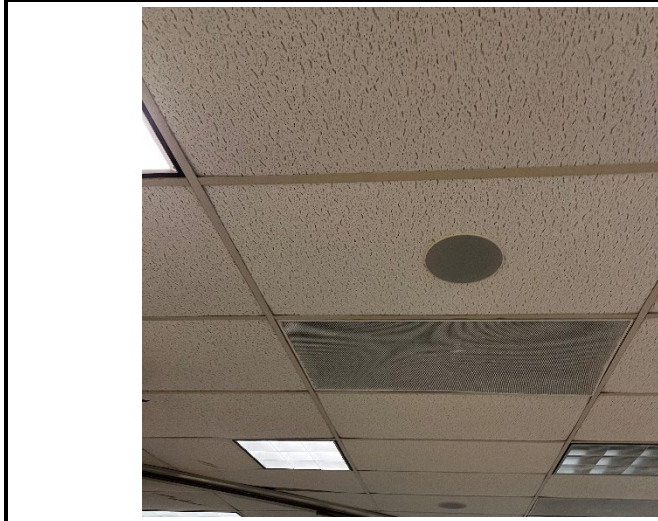


	<p>1. Damaged pipe insulation was observed in the Air Handling Room.</p>
	<p>2. Additional damaged pipe insulation was observed in the Air Handling Room.</p>
	<p>3. Water was found to be draining rapidly under the air handling unit.</p>

	<p>4. Mold was observed on the underside of the table in Room 219.</p>
	<p>5. Mold was observed under the middle tables in Room 219.</p>
	<p>6. Mold was observed on the door in Room 215.</p>



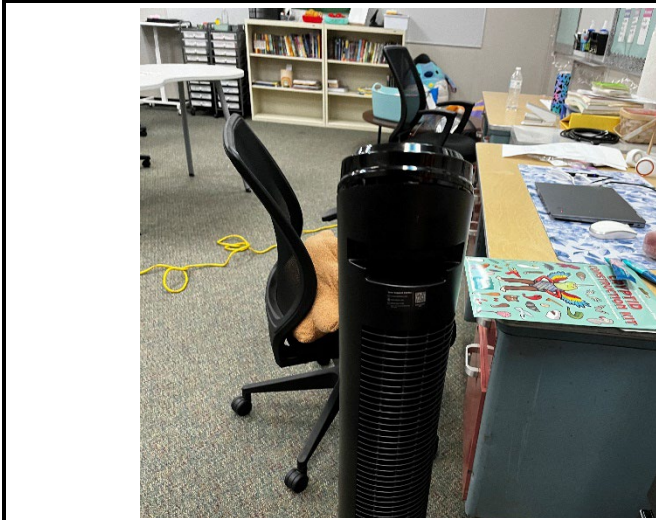
7. Ceiling tiles were observed to be slightly bowing in the Kiva.



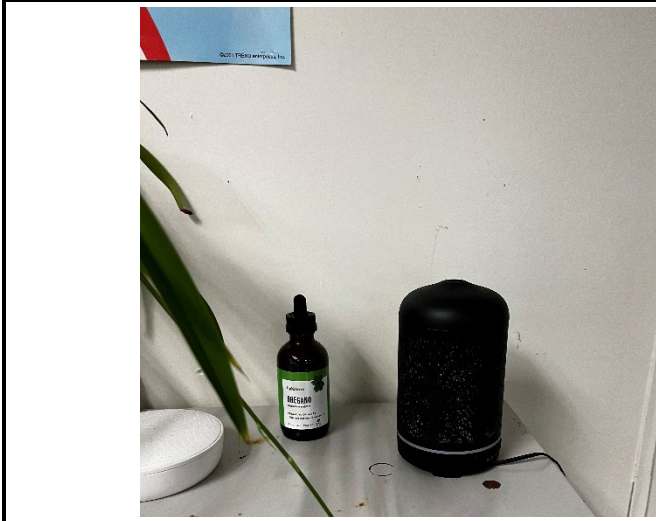
8. Rust marks were observed on the metal ceiling grid in Room 219.



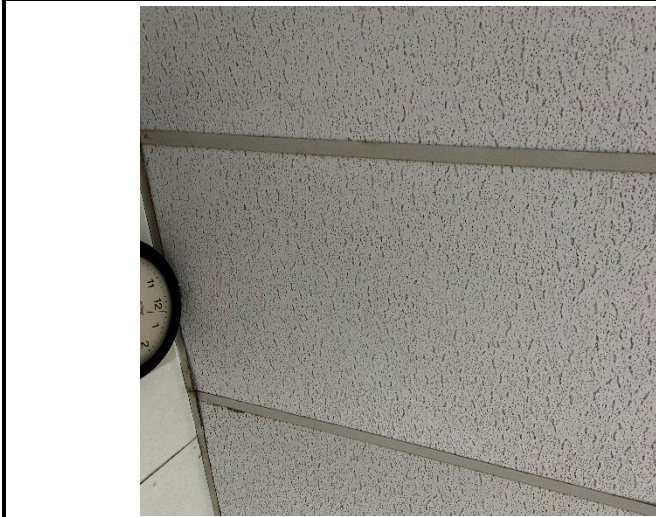
9. A diffuser was found in Room 210.



10. An air cleaner was observed in Room 210.



11. A second diffuser was observed in Room 211.



12. Rusted ceiling tile grid work was observed in Room 215.