

February 7, 2014

Mr. Michael Howard  
Clay Community Schools  
1013 South Forest Avenue  
Brazil, Indiana 47834

**RE: INDOOR AIR QUALITY ASSESSMENT  
CLAY CITY ELEMENTARY SCHOOL, CLAY CITY, INDIANA  
ALLIANCE ENVIRONMENTAL GROUP PROJECT NUMBER NCL00101**

Dear Mr. Howard:

Thank you for employing our professional indoor air quality program services at the above referenced site. We appreciate the opportunity to serve Clay Community Schools.

This report addresses indoor air quality (IAQ) conditions in the gym, and rooms A-174, A-129, B-131 and A-153.

### **AIR SAMPLES**

Non-viable air samples were taken in order to provide information regarding airborne particulates at the time of sampling. This type of inspection required the use of an air sampling pump equipped with aerodynamically designed Air-O-Cell cassettes in the gym, and rooms A-174, A-129, B-131 and A-153 and one outdoors for comparison of ambient levels of fungi. The Air-O-Cell cassettes capture all airborne particulates, viable or non-viable, and allows for a rapid identification of fungal spores. These samples were collected for five minutes at a flow rate of 15 liters per minute. A total volume of 75 liters of air was collected. Samples were collected on January 30, 2014.

In general, the process for evaluating Air-O-Cell results is to compare indoor air samples with an outdoor air sample to determine ambient levels of fungi in the environment. If the total indoor spore count (in spores/m<sup>3</sup>) of fungi is less than the total ambient spores/m<sup>3</sup> outdoors, the air quality is acceptable with regards to non-viable fungi. Also, if the types of fungi identified indoors are at lower levels than the concentrations outdoors, the air quality is acceptable with regards to non-viable fungi.

The laboratory reported that indoor concentrations of *Myxomycetes* exceeded the outdoor concentrations in room A-174. The laboratory also reported the presence of *Aspergillus/Penicillium* and *Epicoccum* in the indoor samples which were not identified in the outdoor sample. Elevated levels are typically associated with a water intrusion event.

The results of the airborne fungi sampling are tabulated below.

<b>Sample #</b>	<b>Location</b>	<b>Total Spores/m<sup>3</sup></b>	<b>Fungi Exceeding Outdoor Levels</b>	<b>Fungi Not Found Outdoors</b>
AOC-1	gymnasium	1,200	--	<i>Aspergillus/Penicillium</i> <i>Epicoccum</i>
AOC-2	room A-174	2,810	<i>Myxomycetes</i>	<i>Aspergillus/Penicillium</i> Rust
AOC-3	room A-129	1,940	--	<i>Aspergillus/Penicillium</i> <i>Epicoccum</i>
AOC-4	room B-131	460	--	<i>Aspergillus/Penicillium</i> <i>Epicoccum</i>
AOC-5	room A-153	480	--	<i>Aspergillus/Penicillium</i>
AOC-6	outside	1,480	--	--

*Aspergillus* is found in plant debris and soil. *Aspergillus* may cause allergic bronchopulmonary aspergillosis in individuals suffering from asthma and cystic fibrosis, and may cause sinusitis in some individuals.

*Epicoccum* is a widely distributed fungus found in air, soil and foodstuff. It is a common causative agent of leaf spot on plants. There are no documented cases of *Epicoccum* infection in humans or animals. *Epicoccum* may cause Type I allergic reactions (“hay fever”) in susceptible individuals.

*Penicillium* is a widespread fungus found in soil, decaying vegetation and air. *Penicillium* may cause infections in immunocompromised individuals, and can cause Type I (“hay fever”) and Type III (hypersensitive) allergic reactions in susceptible individuals.

*Myxomycetes* is commonly found on decaying wood and vegetation. *Myxomycetes* is a Type I allergen which may cause reactions (“hay fever”) in sensitive individuals.

Rust is a common plant pathogen. Rust is a type I allergen.

The presence of *Cladosporium* at these levels is typical of the indoor environment. The presence of a single spore of *Epicoccum*, *Myxomycetes* and Rust is considered background level and is not significant.

### **SURFACE SAMPLES**

Visible mold growth and/or water staining was observed in classroom B-131 on a wall near the ceiling. A surface sample was collected from the walls in the classroom. The swab surface samples were collected using a Healthlink Transporter sterile transport swab.

The particles which adhere to the samplers are then evaluated for the presence of fungal spores, fruiting structures and other particulate matter. The laboratory reports the type of particles present on the slide (based on visual identification) and the relative particle frequency. The particle frequency is reported in four categories: rare (1 to 10), low (10 to 100), medium (101 to 1,000) and high (greater than 1,000).

Fungi present in the rare to low category, with no *Stachybotrys* present, are considered to be

acceptable. The presence of hyphae or fruiting structures associated with specific spores is an indication of active fungal growth. The laboratory analysis of the swab sample is as follows:

<b>Sample #</b>	<b>Sampling Location</b>	<b>Fungal Type</b>	<b>Category</b>	<b>Growth?</b>
S-01	B-131	<i>Aspergillus/Penicillium</i>	rare	no

### GENERAL AIR QUALITY

Data for general indoor air quality parameters [temperature, relative humidity, carbon dioxide (CO<sub>2</sub>) and carbon monoxide (CO)], was acquired using an Alnor indoor air quality meter. General indoor air quality data is summarized in the following table:

<b>Location</b>	<b>Temp (°F)</b>	<b>RH (%)</b>	<b>CO<sub>2</sub> (ppm)</b>	<b>CO (ppm)</b>
Gym	73.8	27.1	1490	1.0
A-174	73.2	10.4	535	0.3
A-129	72.4	17.9	1215	1.0
B-131	71.5	19.1	990	0.9
A-153	73.3	22.6	1578	1.0
outside	37.3	20.5	404	0.7
recommended limits	68 - 78	less than 65	less than outside + 700	less than 50

The temperature, relative humidity and carbon monoxide levels recorded in the classrooms were within regulatory limits. Carbon dioxide exceeded the limit established in 410 IAC 33, which at the time of the evaluation was 1,104 ppm carbon dioxide.

### RECOMMENDATIONS

Based on the results of laboratory analysis and conditions observed in the school, Alliance recommends the following:

1. The rooms which exceeded the regulatory limit for carbon dioxide should be evaluated by HVAC technicians to determine if the ventilation system is adequate while occupied.
2. Although no visible mold growth was observed in rooms A-174 and A-129, the air samples were slightly elevated compared to the outside. The air samples indicate there is a high probability of an issue in those rooms. Initially, the air filters in these rooms should be changed more frequently and HEPA filters should be considered for these rooms. The HEPA filters should be stand alone units in each room. In addition, vacuums used in the schools should use HEPA filters, as required by January 1, 2015 per 410 IAC 33-4-6. The rooms should also be evaluated for live plants, room "pets", and other items that may hold spores, such as stuffed animals, etc.

Thank you for the opportunity to assist you with indoor air quality needs.

Sincerely,

Alliance Environmental Group

A handwritten signature in blue ink, appearing to read "J. Rehtin", with a long horizontal flourish extending to the right.

Jeffrey Rehtin  
Project Manager

Attachments



# EMSL Analytical, Inc.

2001 East 52nd St. Indianapolis, IN 46205  
Phone/Fax: (317) 803-2997 / (317) 803-3047  
<http://www.EMSL.com> / [indianapolislab@emsl.com](mailto:indianapolislab@emsl.com)

Order ID: 161401295  
Customer ID: ALLI65  
Customer PO:  
Project ID:

**Attn:** Jeff Rehtin  
Alliance Environmental Group, Inc.  
5340 Commerce Circle  
Suite E  
Indianapolis, IN 46237

Phone: (317) 865-3400  
Fax: (317) 865-3401  
Collected: 01/30/2014  
Received: 01/31/2014  
Analyzed: 01/31/2014

**Proj:** NCL00101

### Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number:	161401295-0001			161401295-0002			161401295-0003		
Client Sample ID:	AOC-1			AOC-2			AOC-3		
Volume (L):	75			75			75		
Sample Location:	Gym			A-174			A-129		
Spore Types	Raw Count	Count/m <sup>3</sup>	% of Total	Raw Count	Count/m <sup>3</sup>	% of Total	Raw Count	Count/m <sup>3</sup>	% of Total
Alternaria	1*	10*	0.8	-	-	-	1	40	2.1
Ascospores	-	-	-	5	200	7.1	4	200	10.3
Aspergillus/Penicillium	20	840	70	13	550	19.6	19	800	41.2
Basidiospores	-	-	-	3	100	3.6	-	-	-
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	6	300	25	40	1700	60.5	16	680	35.1
Curvularia	-	-	-	-	-	-	1	40	2.1
Epicoccum	1*	10*	0.8	1*	10*	0.4	1	40	2.1
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	1	40	3.3	5	200	7.1	3	100	5.2
Pithomyces	-	-	-	-	-	-	1	40	2.1
Rust	-	-	-	1*	10*	0.4	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	1	40	1.4	-	-	-
<b>Total Fungi</b>	<b>29</b>	<b>1200</b>	<b>100</b>	<b>69</b>	<b>2810</b>	<b>100</b>	<b>46</b>	<b>1940</b>	<b>100</b>
Hyphal Fragment	1	40	3.3	7	300	10.7	5	200	10.3
Insect Fragment	3	100	8.3	1	40	1.4	2	80	4.1
Pollen	1	40	3.3	1	40	1.4	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	2	-
Fibrous Particulate (1-4)	-	2	-	-	2	-	-	2	-
Background (1-5)	-	3	-	-	2	-	-	2	-

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

Andrea Brooke, Microbiology Lab Manager  
or Other Approved Signatory

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

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.

Samples analyzed by EMSL Analytical, Inc. Indianapolis, IN AIHA-LAP, LLC--EMLAP 157245

Initial report from: 01/31/2014 15:34:39

For Information on the fungi listed in this report please visit the Resources section at [www.emsl.com](http://www.emsl.com)



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Order ID: 161401295  
 Customer ID: ALLI65  
 Customer PO:  
 Project ID:

**Attn:** Jeff Rehtin  
 Alliance Environmental Group, Inc.  
 5340 Commerce Circle  
 Suite E  
 Indianapolis, IN 46237

Phone: (317) 865-3400  
 Fax: (317) 865-3401  
 Collected: 01/30/2014  
 Received: 01/31/2014  
 Analyzed: 01/31/2014

**Proj:** NCL00101

**Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)**

Lab Sample Number:	161401295-0004			161401295-0005			161401295-0006		
Client Sample ID:	AOC-4			AOC-5			AOC-6		
Volume (L):	75			75			75		
Sample Location:	B-131			A-153			Outside		
Spore Types	Raw Count	Count/m <sup>3</sup>	% of Total	Raw Count	Count/m <sup>3</sup>	% of Total	Raw Count	Count/m <sup>3</sup>	% of Total
Alternaria	-	-	-	1	40	8.3	1	40	2.7
Ascospores	1	40	8.7	-	-	-	6	300	20.3
Aspergillus/Penicillium	4	200	43.5	4	200	41.7	-	-	-
Basidiospores	-	-	-	-	-	-	3	100	6.8
Bipolaris++	-	-	-	-	-	-	1	40	2.7
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	3	100	21.7	4	200	41.7	18	760	51.4
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	1	40	8.7	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	2	80	17.4	1	40	8.3	4	200	13.5
Pithomyces	-	-	-	-	-	-	1	40	2.7
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	-
<b>Total Fungi</b>	<b>11</b>	<b>460</b>	<b>100</b>	<b>10</b>	<b>480</b>	<b>100</b>	<b>34</b>	<b>1480</b>	<b>100</b>
Hyphal Fragment	1	40	8.7	1	40	8.3	3	100	6.8
Insect Fragment	1	40	8.7	-	-	-	2	80	5.4
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	1	-
Fibrous Particulate (1-4)	-	2	-	-	2	-	-	1	-
Background (1-5)	-	2	-	-	3	-	-	3	-

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

*Andrea Brooke*

Andrea Brooke, Microbiology Lab Manager  
 or Other Approved Signatory

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

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.

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**Collected:** 01/30/2014  
**Received:** 01/31/2014  
**Analyzed:** 01/31/2014  
**Proj:** NCL00101

## Test Report: Microscopic Examination of Fungal Spores, Fungal Structures, Hyphae, and Other Particulates from Swab Samples (EMSL Method: M041)

Lab Sample Number	Client Sample ID	Location	Fungal Identification	Category
161401295-0007	S-01	B-131	Aspergillus/Penicillium	Rare
			Fibrous Particulate	Rare

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

Bipolaris++ = Bipolaris/Dreschlera/Exserohilum Myxomycetes++ = Myxomycetes/Periconia/Smut  
\* = Sample contains fruiting structures and/or hyphae associated with the spores.

Category	Count/area Analyzed
Rare	1 to 10
Low	11 to 100
Medium	101 to 1000
High	> 1000

Andrea Brooke, Microbiology Lab Manager  
or Other Approved Signatory

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AIHA-LAP, LLC--EMLAP Accredited #157245

Initial report from: 01/31/2014 15:34:39

For Information on the fungi listed in this report please visit the Resources section at [www.emsl.com](http://www.emsl.com)

- FUNGI  
 BACTERIA

**Alliance**

THE ENVIRONMENTAL SOLUTION

Job Name Clay Community School  
 Location Elementary School  
 Collected By Jeff Reenth

161401295 24 hr. TAT  
 Date 1/30/14  
 Job Number NCLOO101  
 Contractor \_\_\_\_\_

Sample Number	Pump I.D.	Sample Location	Sample Period		Calibration Rate		Volume Liters	Colonies	CFU /M <sup>3</sup>
			Start	Stop	Start	Stop			
AOC-1	BIO	Gym	120	125	5	BIO	4575		
AOC-2	BIO	A-174	140	145	5	BIO	4575		
AOC-3	BIO	A-129	159	204	5	BIO	4575		
AOC-4	BIO	B-131	214	219	5	BIO	4575		
AOC-5	BIO	A-153	232	237	5	BIO	4575		
AOC-6	BIO	outside	257		5	BIO	75		

**CHAIN OF CUSTODY**

SAMPLE BY: Jeff Reenth  
 DATE: 1/30/14  
 SIGNATURE: [Signature]  
 DATE SHIPPED: 1/30/14

RECEIVED BY: [Signature]  
 DATE: 1-31-14  
 SIGNATURE: [Signature]  
 SHIPPED VIA: \_\_\_\_\_

RECORDED BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_  
 SIGNATURE: \_\_\_\_\_  
 SHIPPED TO: \_\_\_\_\_  
 LOG#: \_\_\_\_\_



# CHAIN OF CUSTODY RECORD

401295

**ALLIANCE ENVIRONMENTAL GROUP, INC.**

5340 Commerce Circle, Suite E  
 Indianapolis, IN 46237  
 317-865-3400 • Fax 317-865-3401

Project Name Clay Community Schools  
 Project Location Clay City E.S.  
 Project # NCLOOIO1 Date 1/30/14

SAMPLE I.D. NUMBER	LOCATION OF SAMPLE	DESCRIPTION OF SAMPLE MATERIAL
S-01	B-131	SWAB

Analysis Direct Read Turn-around Time 24 Hr.

Comments \_\_\_\_\_

Sample by Jeff Rechten (Print) Received by Drop Box (Print) Recorded by \_\_\_\_\_ (Print)  
 Signature [Signature] Signature [Signature] Signature \_\_\_\_\_  
 Date 1/30/14 Date 1-31-14 8:00 Date \_\_\_\_\_