

February 20, 2014

MB3 99 RLP-277

Dr. Kimberly Tucker, Superintendent  
Clay City High School  
601 N. Lankford Street  
Clay City, IN 47841

Dear Dr. Tucker:

The purpose of this letter is to report the result of our indoor air quality evaluation at the school on February 12, 2014. This evaluation was conducted at the request of a concerned citizen to address the health concerns of the occupants that may be related to indoor air quality of the school.

The Indiana State Department of Health's Microbiological Laboratory incubated and counted the fungal and bacterial units. The total colony forming units per cubic meter of air (CFU/M<sup>3</sup>) were computed by adding the fungal and bacterial counts, and dividing the sum by the total volume of the sampled air. Please refer to Table 1 for further details. Fungal counts inside the band room were higher than the outdoor counts. There are no limits established as an acceptable concentration of fungal counts indoors. There are guidelines that recommend fewer counts indoors than outdoors.

The Carbon dioxide (CO<sub>2</sub>) level was measured inside the classrooms. The highest carbon dioxide level measured was 534 parts CO<sub>2</sub> per million parts of air (ppm). The School Indoor Air Quality rule, 410 IAC 33-4-2 states "carbon dioxide concentrations in the breathing zone shall never exceed 700 ppm over the outdoor concentration", in this case giving a limit of 1136 ppm. ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) recommends 15 cfm (cubic feet per minute) of outdoor air per person for classrooms.

The outdoor relative humidity was measured at 28 percent (%). The indoor relative humidity was between 8% and 10%. The American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) recommends the relative humidity in habitable spaces preferably should be maintained between 30% and 60% to minimize growth of allergenic and pathogenic organisms. Humidity levels above 50% have been found to increase the population size of molds, fungi and mites that may cause allergies.

The evidence suggests that humidity levels should be maintained between 40% and 50% to reduce the incidence of upper respiratory infections and to minimize the adverse effect on people

suffering from asthma or allergies. Such a range would be hard to maintain, however, exposure to higher or lower levels are unlikely to affect the health of most people.

The following deficiencies were noted during the inspection:

- 1) **410 IAC 33-4-6 (c):** states “**when a water leak or intrusion is discovered, corrective action shall be taken within forty-eight (48) hours**”. *Visible water staining was observed on the ceiling tile inside the band room and room 104/105. A thorough visual exam should be done above the ceiling plenum inside these rooms. Steps should be taken to address the water intrusion problem underneath the exterior door inside the band room. The underside of the carpet should be inspected for mold growth inside the band room.*
- 2) **410 IAC 33-5 a)** states “**Schools shall establish and maintain a written procedure for routine maintenance of HVAC systems**”. *This procedure shall include, but is not limited to the following items: 1) A schedule for inspecting the HVAC system including an annual inspection. 2) Ensuring that all supply and return air pathways in the ventilation system are unobstructed and perform as required. 3) A schedule for cleaning the HVAC coils annually at a minimum. 4) A schedule for inspecting and changing filters.*
- 3) **410 IAC 33-5 b)** states “**Schools shall establish and maintain written maintenance logs covering cleaning and filter changes of the HVAC systems for a minimum of three (3) years. These logs shall be available for the state inspector’s review.** *These written procedures and logs do not have to be maintained on site, but there needs to be a means of making them available for our inspector’s review.*
- 4) **410 IAC 33-4-9:** states “**furniture in classrooms shall be maintained so as to prevent the accumulation or growth of allergens**”. *The Sanitary Schoolhouse rule states “all furniture and equipment used in any school building or a part of a building used for school purposes shall be durable and easily cleanable”. We observed some residential style furniture inside room 104/105 that may not meet the definition of easily cleanable.*

Individuals experiencing any health problems should seek medical advice from a physician.

Please respond within 60 days of any actions you take based upon this report.

The School Indoor Air Quality rule 410 IAC 33-6-2 requires this report, and your response to this report, to be posted for 14 days at the location of the school building stated in the report so they are accessible to all students, parents, and employees.

If you have questions, please contact me at 317/351-7190 ext. 264

Sincerely,



RICK PLEW, INDUSTRIAL HYGIENIST  
INDOOR AIR PROGRAM  
ENVIRONMENTAL PUBLIC HEALTH DIVISION

Enclosure

**TABLE 1**

**Clay City High School  
601 N. Lankford Street  
Clay City, IN 47841**

**Computed Microbiological Air Sample Results  
Taken February 12, 2014**

SAMPLE ID	LOCATION	NO. OF OCCUPANTS	RELATIVE HUMIDITY (%)	CARBON DIOXIDE (ppm)	AIR SAMPLED (liters)	FUNGAL COUNT (CFU/M <sup>3</sup> )	BACTERIAL COUNT (CFU/M <sup>3</sup> )	TOTAL COUNT (CFU/M <sup>3</sup> )
1	Rm. 104/105	4	9	463	200	0	0	0
2	Rm. 208	-	9	437	200	0	0	0
3	Rm. 210	-	9	448	200	0	0	0
4	Rm. 212	-	10	456	200	0	5	5
5	Rm. 213	-	8	450	200	0	0	0
6	Library	6	9	457	200	0	0	0
7	Band Rm.	18	9	534	200	45	30	75
8	Outdoor	-	28	436	200	0	5	5

**Notes:** 2-hour Delay due to weather conditions. Most classrooms were unoccupied.

**% -----percent**

**ppm-----parts per million**

**CFU/M<sup>3</sup>—colony forming units per cubic meter of air**