



Rod R. Blagojevich, Governor  
Damon T. Arnold, [REDACTED], M.D., M.P.H., Director

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Case #:708010701

June 30, 2008

Ms. Mary Kalou  
Assistant Superintendent of Business and Operations  
Lake Zurich School District 95  
400 S. Old Rand Rd.  
Lake Zurich, IL 60047-2459

Dear Ms. Kalou:

Mr. Thomas Baughman, Ph.D., Environmental Toxicologist, West Chicago Regional Office, has reviewed the Health Questionnaires that you distributed to 60 staff at May Whitney Elementary School (May Whitney). Thirty people responded, and 13 (22%) had complaints. According to the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), a 20% complaint rate is "normal" for a non-problem building. This suggests that any problems at May Whitney are confined to specific areas, rather than building-wide. Most of the complaints 10 (17%) were temperature-related, with 9 (15%) complaining about temperatures being too hot. In a June 25, 2008 telephone conversation, you told Mr. Baughman that you planned to replace the temperature-regulating system during the summer, which should alleviate these complaints.

Eight people (13%) complained about lack of air circulation/stuffiness. This may be caused by inadequate outside air intake in these rooms. Mr. Baughman plans to examine the ventilation system of May Whitney in the fall using carbon dioxide as an indirect indicator of the outside air intake. We exhale carbon dioxide, and the difference between the inside and outside carbon dioxide concentration can be used to calculate the outside air intake using the formula:

$\text{cfm/person} = 10,500 / (\text{CO}_{2\text{in}} - \text{CO}_{2\text{out}})$ , where:

cfm/person = Cubic feet per minute per person.

$\text{CO}_{2\text{in}}$  = Inside carbon dioxide concentration.

$\text{CO}_{2\text{out}}$  = Outside carbon dioxide concentration.

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Division of  
Environmental Health

Because this method relies on the amount of carbon dioxide exhaled by people, it will provide accurate results only if the building is fully occupied, and all windows are closed. On June 25, 2008, you told Mr. Baughman that you have an instrument for measuring airborne carbon dioxide. We recommend using this instrument to determine the outside air intake of all rooms in the building, once it is fully occupied. ASHRAE recommends that the outside air intake of

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schools be at least 15 cfm/person. Inadequate outside air intake is the most common cause of indoor air complaints. If the outside air intake is inadequate, chemicals from cleaners, markers, people, etc. tend to build up over the day, which may cause mucous membrane (eye, nose, and throat) irritation, as well as odors. Some people experience transient headache because of odors.

Six people (10%) in the school complained about odors, and one specifically mentioned bus odors. On June 25, 2008, you told Mr. Baughman that some buses are parked overnight within about 30 feet of the school, and that running them in the early morning during cold weather sometimes causes exhaust odors in two rooms. Diesel exhaust contains little or no carbon monoxide; however, it contains particulates and nitrogen oxides, which can be irritating. Any irritant may aggravate asthma. Consequently, we recommend parking the buses further from the building. You told Mr. Baughman that bus drivers park near the building because they want to park where the lot is lit. Installing additional lighting farther from the building may alleviate these concerns.

Few people reported any actual health symptoms, with one (2%) reporting eye irritation, 3 (5%) reporting sinus irritation, 1 (2%) reporting sinus infection, 2 (3%) reporting dry/sore throat, 4 (7%) reporting cough, 2 (3%) reporting wheezing, 1 (2%) reporting difficulty breathing, 1 (2%) reporting chest pain, 2 (3%) reporting headaches, 1 (2%) reporting fatigue/drowsiness, and 1 (2%) reporting extreme laryngitis. Again, this suggests that the building does not have widespread problems. Six people (10%) reported allergies, which is about half the allergy rate of the general population. Two of these people reported no problems in the building. If allergies (e.g., mold) were causing problems throughout the building, symptoms rates should have been greater, and more people should have reported allergies. However, without examining the building, our department cannot exclude the possibility of localized problems affecting only a few people.

On the Building and Ventilation System Questionnaire, you indicated that HVAC filters are changed every 6 months. Generally, manufacturers recommend replacing HVAC filters at least quarterly. We recommend checking with the manufacturer to determine if these filters should be replaced quarterly instead of every 6 months.

You also indicated that water-damaged carpet was cleaned rather than replaced. At the June 25, 2008 meeting our department had with 2 concerned parents and State Representative Ed Sullivan, one of the parents alleged that carpet remained submerged by water for at least a week. If porous material such as carpeting remains wet for more than 24-48 hours, it should be discarded and replaced, rather than cleaned. Mold spores begin to germinate in 24-48 hours once supplied with sufficient moisture, and once mold grows in a porous material, it cannot be removed. Consequently, if the carpeting remained wet for more than 24 hours, replacement would be necessary.

You also indicated that you did not know whether the ventilation system was balanced after the numerous building additions. If additions are made to a ventilation system, it should be balanced. Balancing equalizes the pressures within a ventilation system to ensure that every distribution outlet gets the right amount of air. Otherwise, unequal pressures may cause some areas to be over-ventilated, while others remain stagnant. This would be more likely to occur in multiple rooms served by a common air handler, rather than in individual classrooms served by univents.

In the past, you have relied on mold testing to evaluate the building; however, mold testing is not a reliable method for evaluating a building. Limitations of mold testing (especially airborne testing, but also bulk or dust testing) include:

1. No health-based standards or guidelines for acceptable concentrations exist.
2. Concentrations vary considerably with time. For air sampling in particular, one study suggested that at least 18 samples per location would be necessary to get a statistically representative average sample.
3. Indoor and outside mold concentrations have been shown to vary independently.
4. No one knows how much mold it takes to cause a problem, and studies have failed to find a good correlation between measured concentrations (including air sampling, bulk sampling, and carpet dust sampling) and symptoms.
5. People vary considerably in their sensitivity to molds, with some people affected by the concentrations commonly present in outdoor air.
6. Moisture promotes the growth of bacteria, cockroaches, and dust mites, which also can aggravate allergies and asthma. Mold is not the cause of all respiratory responses.
7. The type of mold is not that important. Most, if not all molds potentially can aggravate allergies and asthma.
8. The method of dealing with mold is the same, regardless of the types of mold present. Stop the water problem, and then do a proper cleanup.
9. Money spent on mold testing generally is better spent on correcting problems.

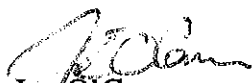
Dr. Baughman previously recommended that you follow the U.S. Environmental Protection Agency "Tools for Schools" program, and he provided the website. This program is designed to try to ensure adequate indoor air quality in school buildings. During our June 25, 2008 meeting with the two concerned parents and Rep. Sullivan, one of the parents said you discontinued following the Tools for Schools program. If this is true, we recommend reinstating the program.

We recommend:

1. Using your carbon dioxide meter to ensure that all areas of the school get at least 15 cfm/person of fresh outside air.
2. Promptly repairing any water leaks, cleaning affected nonporous surfaces, and replacing any porous surfaces that remained wet more than 24-48 hours.
3. Installing more lighting in the parking lot farther from the building, so bus drivers feel comfortable parking their buses further from the building.
4. Asking the manufacturer if the HVAC filters should be changed quarterly rather than every 6 months.
5. Balancing the HVAC system after any additions.
6. Not relying on mold testing. Mold testing cannot establish that the indoor air quality of a building is acceptable, and mold testing has limited (if any) value.
7. Following the U.S. Environmental Protection Agency "Tools for Schools" program.

Please feel free to contact Thomas Baughman at our West Chicago Regional Office at 630-293-6800 or [Tom.Baughman@illinois.gov](mailto:Tom.Baughman@illinois.gov) if you have any questions.

Sincerely,



Joe O'Connor

Senior Public Service Administrator

cc: West Chicago Regional Office  
Environmental Toxicology, Springfield ✓  
State Representative Ed Sullivan