Illinois Department of
PUBLIC HEALTH

Rod R. Blagojevich, Governor
Eric E. Whitaker, M.D., M.P.H., Director

4302 North Main Street • Rockford, Illinois 61103-5202 • www.idph.state.il.us

January 13, 2004

STEPHENSON COUNTY- Freeport
Carl Sandburg Middle School
Indoor Air Investigation
#101070401

Greg Munda
Director of Facilities and Grounds
Freeport School District No.145
2037 W Galena Ave
Freeport, IL 61032

Dear Mr. Munda:

At the request of the Stephenson County Health Department, the Illinois Department of Public Health conducted a limited indoor air investigation at the Carl Sandburg Middle School. The investigation was initiated in response to reports of students developing rashes while in the school building.

Maintenance personnel from the school district accompanied our representative, Steve Johnson during our visit on January 7, 2004. Our conclusions and recommendations are included in the enclosed report.

If you have any questions or if we can be of any further service, please feel free to contact our Rockford Regional Office at 4302 North Main Street, Rockford Illinois 61103, telephone 815/987-7511.

Sincerely,

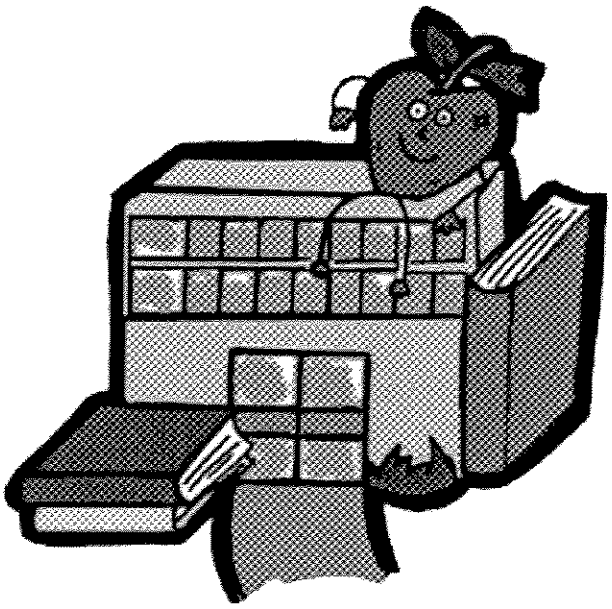
Clayton E. Simonson, L.E.H.P.
Acting Regional Supervisor

SJ:sj
cc - Central Office
- Rockford Regional Office
- Jeff Todd, Stephenson County Health Dept.

Enc.

INDOOR ENVIRONMENTAL QUALITY INVESTIGATION

Carl Sandburg Middle School
Freeport School District 145
1717 Eby St
Freeport, Illinois 61032
IDPH File No. 101070401



Illinois Department of Public Health
Division of Environmental Health
Toxicology Program
January 2004

PURPOSE

The Illinois Department of Public Health (IDPH) has performed a limited indoor environmental quality (IEQ) investigation of the Carl Sandburg Middle School in response to concerns from the Stephenson County Health Department and school administration about a number of students developing a rash while in the school building. Information indicated the problem began on January 5, 2004 after students returned from Christmas break.

BACKGROUND

The information this office received indicated that on Monday, January 5, 2004 several students developed a rash on their arms. The students' skin color was described as very red and warm to the touch with raised welts. The Stephenson County Health Department was initially contacted. Additional students were affected on January 6 and the County Health Department sent a communicable disease nurse to the school. It was at this time that the County Health Department requested that IDPH conduct an indoor air investigation. Additional students and a couple of teachers were affected January 7th and 8th with the same rash like symptoms that appeared mainly on the arms (some students also experienced the rash on areas of the neck and waistline). As of January 12, there have been approximately 95 students that developed the rash. According to information provided, physicians who have seen some of the students have described the rash as contact dermatitis and have not recommended that the students stay out of school.

The Carl Sandburg Middle School has a student population of approximately 650 students (5th and 6th grades). School facilities include a gymnasium and indoor swimming pool. The swimming pool has not been used since the return to classes.

On January 7, 2004, accompanied by maintenance staff from the school district, IDPH conducted a preliminary inspection at the school. This included air monitoring and a visual inspection of the school building with particular attention being spent looking for areas of moisture damage and mold growth. Maintenance staff was also questioned regarding any changes in cleaning chemicals, pesticide applications, operation and maintenance of the heating, ventilation and air conditioning system (HVAC).

The school was built in 1969 with alterations made to the HVAC in the 1990s. Heating is provided by a combination of hot water baseboard radiators and rooftop forced air ventilators. The rooftop ventilators also provide air conditioning during the summer months. Each classroom has at least two air intakes and one exhaust. The school is zoned with approximately six classrooms to a ventilator. The rooftop ventilators are provided with dampers that adjust the amount of fresh air into the building (based on temperature and carbon dioxide readings). Exhaust air is mixed with fresh air, then heated or cooled and returned to the classrooms. Metal ductwork is used for both intake and exhaust (the space between the drop ceiling and roof deck is not used for air circulation). The ductwork appears to be in good condition. According to maintenance personnel, the rooftop units (including condensation pans) are clean. The filters for the units were also checked and did not need to be replaced at this time.

Investigation Results

There was no visible mold growth during our investigation. However, there were water stains on a number of ceiling tiles in room 403. According to maintenance personnel, this area was damaged by rainwater during replacement of the roof. Maintenance personnel indicated that the area has been visually checked for mold and none was observed.

It was noted that there are flammable chemicals being stored in a special cabinet in the art room. According to the art teacher these chemicals are no longer used.

Ventilation assessment monitoring for carbon dioxide (CO_2), relative humidity (%Rh) and temperature (°F) was conducted with a Q-Trak Indoor Air Quality Monitor. Carbon monoxide was also monitored for during our investigation and none was detected. The school was occupied during this assessment. The results are listed in table 1.

Carbon dioxide is a normal constituent of exhaled breath and is commonly used as a screening tool to evaluate whether adequate volumes of fresh outdoor air are being introduced into a building. The outdoor concentration of CO_2 ranges between 350 - 450 parts per million (ppm). If indoor levels are more than 1,000 ppm, there is probably inadequate ventilation; and complaints such as headaches, fatigue, eye and throat irritation may be prevalent. The CO_2 itself is not responsible for the complaints. High levels of CO_2 may indicate the presence of other contaminants in the building that could be responsible for occupant complaints. The levels of CO_2 detected during our investigation ranged from 470 to 1,390 ppm.

Relative humidity is an important factor in indoor air quality because moisture levels are linked to occupant comfort and other considerations. High moisture levels impair the body's ability to lose heat and can lead to microbial or mold growth. This growth may lead to irritating odors, cause permanent damage to building components and result in a variety of infectious or allergic illnesses for building occupants. Excessively low moisture levels result in dry air that can irritate the lungs, eyes, nose, throat and skin. ASHRAE (Standard 55-1992) recommends that %Rh be maintained between 30% and 60%. The %Rh measured in the school ranged from 8.2% to 25.1%.

Temperature is frequently identified in indoor air complaints because it is directly linked to occupant comfort. Excessively high or low temperatures can lead to general thermal discomfort and occupant dissatisfaction. ASHRAE (Standard 55-1992) recommends that temperatures be maintained between 68 and 75 degrees (71 degrees is optimal) during the winter months and between 73 and 79 degrees (76 degrees is optimal) during the summer months. These ranges are generally acceptable for sedentary or slightly active persons. The temperature measured in the school ranged from 69.5 to 74.5 degrees.

CONCLUSIONS AND RECOMMENDATIONS

Based on the information gathered during our visual inspection of the school building, environmental monitoring for CO_2, %Rh, temperature and discussions with the building maintenance personnel, we have the following conclusions and recommendations:

1. As indicated by our air monitoring, there are zones where the carbon dioxide levels measured in the classrooms exceeded 1,000 ppm. We recommend that you have the fresh air intake dampers on the HVAC rooftop units adjusted to maintain the carbon dioxide levels at less than 1,000 ppm. Consultation with an HVAC control company may be needed to ensure that the dampers for the HVAC units are set at the recommended ASHRAE guidelines for the number of building occupants.

2. The relative humidity in the occupied classrooms ranged from 9% to 18%. The low relative humidity may contribute to occupant discomfort. Low relative humidity is common in buildings in Illinois during the winter months.

3. No visible areas of mold growth were noted during the inspection; however, we did notice a number of stained ceiling tiles in the area of room 403. We recommend that these tiles be replaced and that the area above the tiles again be visually inspected to make sure there is no mold growth.

4. The unused solvents, glues and paints stored in the art room should be properly disposed of.

5. It is our understanding that the HVAC rooftop units are routinely inspected, maintained and cleaned. This practice should continue.

6. The U.S. Environmental Protection Agency has developed the *Indoor Air Quality (IAQ) Tools for Schools* kit. This kit shows schools how to carry out a practical plan of action to improve indoor air problems at little or no cost using straightforward activities and in-house staff. The kit includes checklists for school employees, a guide for coordinating the checklists, fact sheets on indoor air pollution issues, sample policies and memos. Information in this kit may be helpful to the district in your continuing effort to address indoor air concerns. Further information about the kit can be found online at www.epa.gov/iaq/schools/.

7. Based on the environmental monitoring and information gathered during the investigation at the school, we could not identify a clear origin or causative agent for the rashes experienced by the students. Staff from the Stephenson County Health Department continue to work with the school administration in an effort to rule out any infectious agents that may be contributing to the described symptoms.

Preparer of Report

Steve Johnson
Environmental Health Specialist
Illinois Department of Public Health
Environmental Toxicology Program

Table 1

Location: Carl Sandburg Middle School - Freeport IL
Date: January 7, 2004
Outdoor Temp: ~ 10 – 14 °F
Time Range: 10:45 am – 12:10 pm
Outdoor Carbon Dioxide: ~ 430ppm

Room	Zone	Occupants	CO_2 ppm	Temp °F	%Rh	CO ppm
308	A	6	993	69.5	15.1	0
306	A	20	907	72.1	12.7	0
311	B	4	929	71.3	13.2	0
312	B	22	1200	71.5	15.0	0
313	B	19	1230	71.4	15.2	0
303A	B	12	1168	72.2	14.2	0
300	C	25	1065	71.4	13.4	0
317	C	18	1130	72.2	14.6	0
315	C	7	1067	71.8	13.6	0
410	D	29	936	73.3	12.6	0
403	D	0	470	72.6	8.2	0
400	D	1	966	71.2	13.0	0
115	E	22	1053	73.5	12.1	0
116	E	20	910	73.9	11.7	0
117	E	24	1102	73.4	12.9	1
118	E	23	1140	74.0	13.6	0
114	F	6	985	73.0	12.3	1
113	F	0	1035	71.5	13.3	0
105	G	0	1010	70.8	13.2	0
106	G	17	1250	71.0	15.0	0
109	G	26	1390	71.5	18.0	0
110	G		1175	71.4	14.7	0
211	H	0	529	72.7	9.9	0
208	H	5	589	74.5	9.1	1
Gym	I	~ 50	1208	73.4	25.1	1

Zones - indicate areas with common ventilation system
ppm – parts per million