

**Illinois Department of
Public
Health**

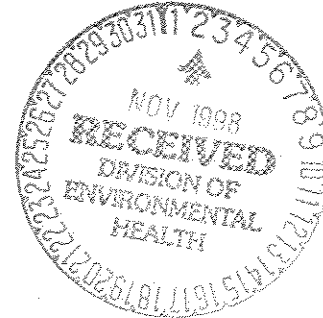
Jim Edgar, Governor • John R. Lumpkin, M.D., M.P.H., Director

4302 North Main Street • Rockford, Illinois 61103-1209

October 29, 1998

Case# 104299701

Dr. Richard Sens
Belvidere School Administrative Office
1201 5th Ave
Belvidere, IL 61008



Dear Dr. Sens:

At your request, bioaerosol sampling was conducted at the Kishwaukee School in Garden Prairie on October 15, 1998 by this Department. Fifteen air samples were collected using an Andersen Sampler. Three sets of plates were used for each air sample; malt extract agar for fungi, cellulose agar for cellulose digesting fungi (e.g. *Stachybotrys*) and soy-casein media for bacteria. In addition to the air samples, two bulk dust samples and two scotch tape samples of visible mold were also collected. All the samples were analyzed by Luke Curtis, MS, CIH at the University of Illinois at Chicago. The results of the mold and bacteria samples are listed in tables 1 and 2. For your information, we have included the bioaerosol results from Lincoln School in Belvidere (March 1997) in table 3 for comparison (these results are probably better compared to the May 1997 results from Kishwaukee School).

Mr. Curtis provided a rather detailed summary of his findings, which we have included as appendix 1. In short, the indoor levels of viable spores are at a moderate level and dominated by *Cladosporium herbareum* (which may have come in from the outdoors) and *Rhizopus oryzae*. The two bulk dust samples were plated out on fungi and cellulose media then observed for a qualitative assessment of fungi present. As you can see from table 2, the fungi present in the dust samples are basically those observed in the air samples. The two scotch tape samples actually collected samples of growing mold observed in the building. These samples were then examined microscopically. Again, as you can see in table 2, the fungi observed are basically those observed in the air samples. During this sampling event, there were no viable *Stachybotrys* spores isolated.

The bacterial concentrations for all the samples, except K9, were generally low. The bacterial concentrations in sample K9 were generally moderate.

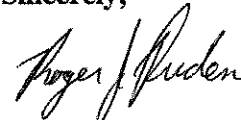
There are no indoor air standards for bioaerosols. In addition, it is very difficult to correlate adverse health effects with slightly elevated levels of bioaerosols. I think what is important to note is that based on current and past sampling at the school, the level of bioaerosols are slightly elevated and some of the rooms are not adequately ventilated (April/May 1997 ventilation study). In addition, based on some of our conversations with staff members during sampling events, it is apparent that there is a moisture problem (at least at certain times of the year) in the school and that some sensitive individuals are experiencing some adverse health effects, possibly related to the quality of the indoor air in the school.

Based on our investigations to date, our recommendations concerning the indoor air quality in the school are as follows;

1. Correct the moisture and humidity problems. Controlling moisture levels in the building and preventing condensation on building components is key to controlling mold growth and reducing bioaerosol levels.
2. It is our understanding that there have not been any modifications to the ventilation system since our initial investigation in April/May 1997. As such, we still expect the levels of carbon dioxide to be slightly elevated. Increasing ventilation rates to maintain carbon dioxide levels below 1,000 parts per million will help to dilute any indoor air pollutants and reduce the number of indoor air complaints.
3. Provide fresh air ventilation in both the Resource and Multi-Purpose rooms.
4. The ventilation equipment should be properly used and maintained (air filters should be changed or cleaned on a regular basis). During both sampling events it was noted that a unit ventilator in one of the class rooms had been shut off. These units are the only source of fresh air, we recommend that they not be shut off. If the units are being shut off because of high noise levels, then they should be repaired.
5. We are aware that you are actively seeking a solution to the indoor air problem at the school. We recommend that during any renovation or repairs, the class rooms in that area of the building not be used. In addition, we recommend that the construction workers be advised to report any visible mold growths they may encounter and that these areas be thoroughly cleaned.

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

Sincerely,

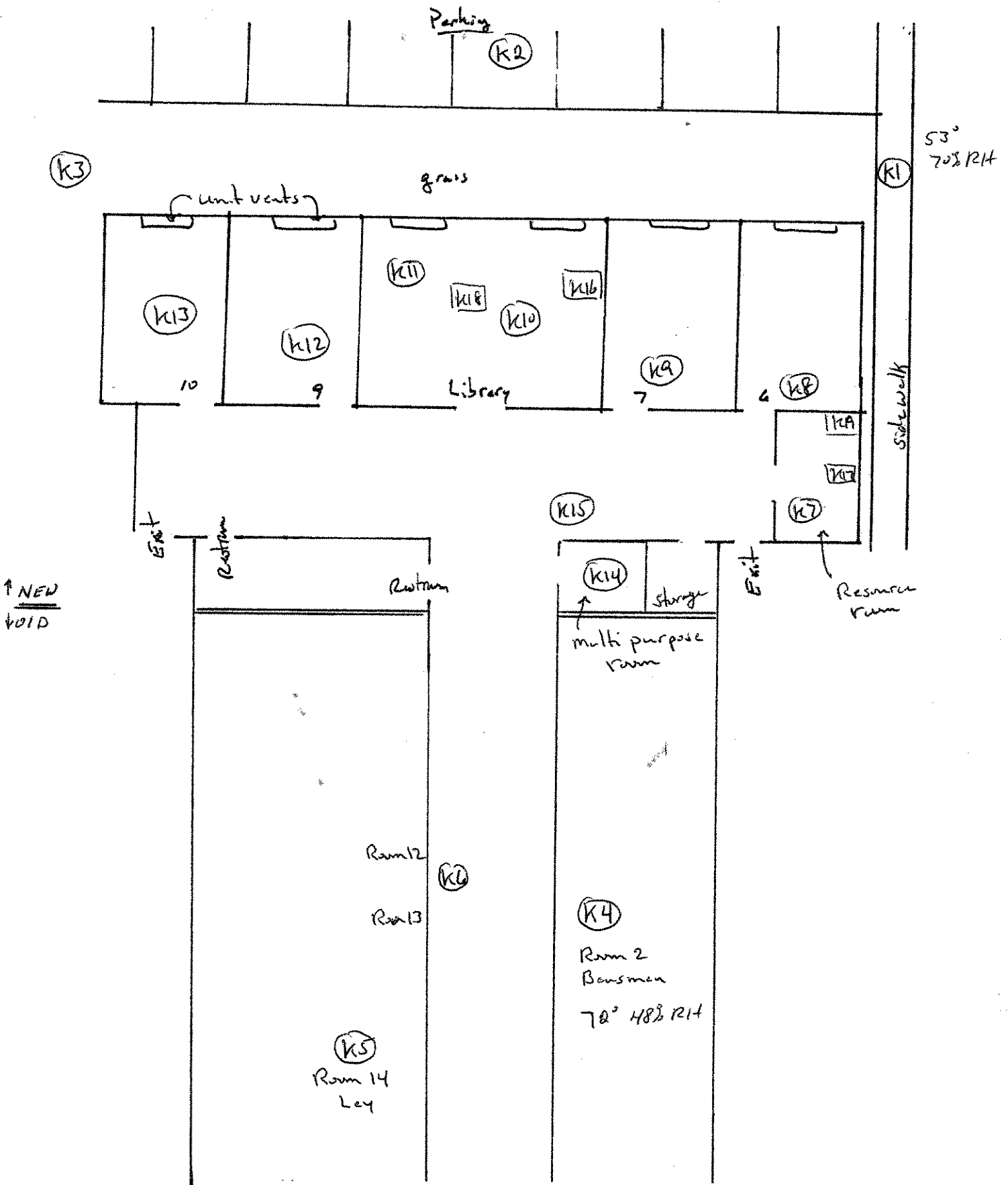


Roger J. Ruden, P.E.
Regional Engineer

SJ:sj

cc - Central Office
- Rockford Regional Office
- Art Commare

enc.



BIOAEROSOL SAMPLE LOCATIONS
KISHWAUKEE SCHOOL, GARDEN PRAIRIE IL
 10/15/98



Table 1.

| Fungi, Cellulose and Bacteria Plates Collected at Kishwaukee School in Garden Prairie, Illinois on Thursday, October 15, 1998. Sample volume in all cases was 0.056 m ³ . | | | | | | |
|--|---|--|-------------------------------------|------------------------|------------------------|--|
| Sample Number and Location | Fungi Plates- cfu/m ³ (Note that total fungi may vary slightly from sum of species due to rounding errors.) | Cellulose Plates- cfu/m ³ | Bacteria Plates- cfu/m ³ | | | |
| | | | Total Bacteria | Gram Positive Bacteria | Gram Negative Bacteria | |
| K1 outside southwest - cloudy, 53 °F, gentle breeze, 70 %RH | 1,026 total fungi 717- Cladosporium herbarium 193- Trichoderma 97- Rhizopus oryzae 19- Fusarium | 1,170- total fungi 878- Cladosporium herbarium 136- Rhizopus oryzae 98- Fusarium 59- Trichoderma | 180 | 108 | 72 | |
| K2 outside south | 900- total fungi 708- Cladosporium herbarium 77- Rhizopus oryzae 57- Fusarium 57- Mucor racemosus | 504- total fungi 317- Cladosporium herbarium 131- Alternaria 37- Epicoccum (dark color) 19- Fusarium | 162 | 108 | 54 | |
| K3 outside southeast | 2,412- total fungi 1,862- Cladosporium herbarium 275- Cladosporium sphaerospermum 233- Trichoderma 42- Penicillium chrysogenum | 2,250- total fungi 1,954- Cladosporium herbarium 148- Trichoderma 84- Rhizopus oryzae 63- Fusarium | 126 | 72 | 54 | |

Fungi, Cellulose and Bacteria Plates Collected at Kishwaukee School in Garden Prairie, Illinois on Thursday, October 15, 1998. Sample volume in all cases was 0.056 m³.

| Sample Number and Location | Fungi Plates- cfu/m ³ (Note that total fungi may vary slightly from sum of species due to rounding errors.) | Cellulose Plates- cfu/m ³ | Bacteria Plates- cfu/m ³ | | |
|--|---|---|-------------------------------------|------------------------|------------------------|
| | | | Total Bacteria | Gram Positive Bacteria | Gram Negative Bacteria |
| K4 Room 2 - Occupied, tile floor 72 °F, 48 %RH | 846- total fungi 289- Penicillium glabrum 173- Cladosporium herbarum 154- Fusarium 134- Penicillium chrysogenum 58- Absidia 19- Aspergillus fumigatus 19- Penicillium brevicompactum | 234- total fungi 180- Cladosporium herbarum 54- Rhizopus oryzae | 396 | 264 | 132 |
| K5 Room 14 - Occupied, tile floor, unit vent. off | 2,484- total fungi 1,133- Rhizopus oryzae 996- Cladosporium herbarum 147- Trichoderma 147- Cladosporium cladosporoides 63- Absidia | 648- total fungi 305- Cladosporium herbarum 286- Rhizopus oryzae 57- Fusarium | 90 | 72 | 18 |
| K6 Hallway, between Rooms 12 & 13 in the older section of the school, no kids in hallway | 576- total fungi 390- Rhizopus oryzae 149- Cladosporium herbarum 19- Trichoderma 19- Penicillium glabrum | 702- total fungi 379- Rhizopus oryzae 304- Cladosporium herbarum 19- Trichoderma | 144 | 72 | 72 |

Fungi, Cellulose and Bacteria Plates Collected at Kishwaukee School in Garden Prairie, Illinois on Thursday, October 15, 1998. Sample volume in all cases was 0.056 m³.

| Sample Number and Location | Fungi Plates- cfu/m ³ (Note that total fungi may vary slightly from sum of species due to rounding errors.) | Cellulose Plates- cfu/m ³ | Bacteria Plates- cfu/m ³ | | |
|--|--|---|-------------------------------------|------------------------|------------------------|
| | | | Total Bacteria | Gram Positive Bacteria | Gram Negative Bacteria |
| K7 Resource Room, tiled floor, 3 people in room, some mold on ceiling in sw corner, no fresh air vent. | <u>1,404- total fungi</u> 1,010- Rhizopus oryzae 376- Cladosporium herbareum 59- Absidia | <u>1,188- total fungi</u> 934- Cladosporium herbareum 98- Penicillium chrysogenum 59- Rhizopus oryzae 59- Epicoccum 39- Alternaria | 180 | 108 | 72 |
| K8 Room 6 - Occupied, tiled floor, Hamster in room | <u>1,782- total fungi</u> 952- Rhizopus oryzae 689- Cladosporium herbareum 142- Trichoderma | <u>342- total fungi</u> 162- Rhizopus oryzae 126- Alternaria 54- Mucor racemosus | 216 | 72 | 144 |
| K9 Room 7 - Occupied, tiled floor, hedgehog in room | <u>1,152- total fungi</u> 604- Rhizopus oryzae 410- Cladosporium herbareum 137- Mucor racemosus | <u>900- total fungi</u> 728- Cladosporium herbareum 58- Rhizopus oryzae 38- Mucor racemosus 38- Epicoccum 19- Penicillium chrysogenum 19- Absidia | 1,008 | 174 | 834 |

Fungi, Cellulose and Bacteria Plates Collected at Kishwaukee School in Garden Prairie, Illinois on Thursday, October 15, 1998. Sample volume in all cases was 0.056 m³.

| Sample Number and Location | Fungi Plates- cfu/m ³ (Note that total fungi may vary slightly from sum of species due to rounding errors.) | Cellulose Plates- cfu/m ³ | Bacteria Plates- cfu/m ³ | | |
|--|--|---|-------------------------------------|------------------------|------------------------|
| | | | Total Bacteria | Gram Positive Bacteria | Gram Negative Bacteria |
| K10 Library (west side) Unoccupied, carpeted floor (Dehumidifier in room) | <u>1,368- total fungi</u> 871- Cladosporium herbareum 139- Trichoderma 139- Rhizopus oryzae 119- Cladosporium sphaerospermum 99- Fusarium | <u>1,188- total fungi</u> 877- Cladosporium herbareum 254- Rhizopus oryzae 58- Trichoderma | 486 | 187 | 299 |
| K11 Library (south east) Unoccupied, carpeted floor | <u>1,152 total fungi</u> 878- Cladosporium herbareum 137- Rhizopus oryzae 137- Trichoderma | <u>954- total fungi</u> 897- Cladosporium herbareum 38- Penicillium brevicompactum 19- Absidia | 198 | 126 | 72 |
| K12 Room 9 - Unoccupied, tiled floor | <u>1,368- total fungi</u> 792- Cladosporium herbareum 555- Rhizopus oryzae 20- Trichoderma | <u>864- total fungi</u> 787- Cladosporium herbareum 58- Fusarium 19- Epicoccum | 198 | 54 | 144 |
| K13 Room 10 - Unoccupied, tiled floor | <u>1,062- total fungi</u> 753- Rhizopus oryzae 232- Cladosporium herbareum 58- Mucor racemosus 19- Penicillium chrysogenum | <u>1,098- total fungi</u> 751- Cladosporium herbareum 327- Rhizopus oryzae 19- Trichoderma | 162 | 126 | 36 |

Fungi, Cellulose and Bacteria Plates Collected at Kishwaukee School in Garden Prairie, Illinois on Thursday, October 15, 1998. Sample volume in all cases was 0.056 m³.

| Sample Number and Location | Fungi Plates- cfu/m ³ (Note that total fungi may vary slightly from sum of species due to rounding errors.) | Cellulose Plates- cfu/m ³ | Bacteria Plates- cfu/m ³ | | |
|--|---|---|-------------------------------------|------------------------|------------------------|
| | | | Total Bacteria | Gram Positive Bacteria | Gram Negative Bacteria |
| K14 Multi-purpose room - Unoccupied, tile floor, no fresh air vent. | <u>324- total fungi</u> 144- Rhizopus oryzae 144- Cladosporium herbareum 36- Penicillium chrysogenum | <u>450- total fungi</u> 356- Cladosporium herbareum 38- Rhizopus oryzae 38- Trichoderma 19- Eurotium Aspergillus glaucus | 252 | 90 | 162 |
| K15 Hallway in newer addition, tiled floor, several students in hall during sampling | <u>2,016- total fungi</u> 1,686- Cladosporium herbareum 226- Rhizopus oryzae 62- Fusarium 41- Penicillium chrysogenum | <u>1,278- total fungi</u> 806- Cladosporium herbareum 452- Rhizopus oryzae 20- Fusarium | 432 | 169 | 263 |

cfu/m³ = colony forming units per cubic meter of air

Table 2.

| Bulk and Tape Sampling from the Kishwaukee School on 10/15/1998. | |
|--|---|
| Location | Fungi observed |
| <p>K16 Bulk dust sample from book shelves, tops of books etc in the Library, composite sample</p> | <p>Cladosporium herbarum Epicoccum (Dark appearance) Alternaria Mucor racemosus Rhizopus oryzae Absidia</p> |
| <p>K17 Bulk dust sample from under heater (west wall) and book shelves in the Resource Room, composite sample</p> | <p>Mucor racemosus Rhizopus oryzae Cladosporium herbarum Alternaria</p> |
| <p>K18 Tape sample from the post in the Library (three small dots of mold)</p> | <p>Dark yeast- While slide preparation is good quality- I am not sure what Genus it is. Most yeasts are identified by biochemical tests (which I lack) - rather than by microscopic morphology. Does not look at all like Stachybotrys.</p> |
| <p>K19 Tape sample from the sw corner of the ceiling in the Resource Room</p> | <p>Epicoccum (dark) Cladosporium herbarum Trichoderma</p> |