EMC Insurance Companies

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Des Moines, IA 50309-3872
P.O. Box 712
Des Moines, IA 50306-0712
Phone 515.280.2511
www.emcins.com

September 6, 2013

Dr. Tom Ward
IKM-Manning Community Schools
P.O. Box 580
755 Main Street
Manilla, Iowa 51454

Policy No.: 4X95818

Dear Dr. Ward:

The enclosed report is for the indoor air quality and mold investigation conducted on August 28, 2013, at Manning Elementary School in Manning, Iowa.

After reading the report, we would appreciate it if you would click this Report Response Survey link to answer a few simple questions. Your feedback is important to the success of our reports.

If you have questions about this report, EMC loss control services, or need further assistance, please feel free to contact me. Additional loss control information can be obtained from our website at www.emcins.com by clicking on the Loss Control tab. If prompted for your policy number, please use **4X95818**.

Sincerely,

Dave Havick, CIH
Senior Industrial Hygienist
Home Office Risk Improvement
Ph: 515 345-2735
Fax: 515 345-2220
Cell: 515 419-3139
Email: Dave.W.Havick@EMCIns.com

Enclosure

Cc: Manilla Insurance Agency - Agency
Stefan Mumm – EMC Des Moines Branch Underwriting
Rob McFarlane – EMC Des Moines Branch Account Coordinator

EMC Insurance Companies

IKM-Manning Community Schools
Manning Elementary

Indoor Air Quality and Mold Investigation

Report Completed
September 6, 2013

Summary

An indoor air quality and mold investigation was conducted on August 28, 2013, in Manning Elementary at the request of Dr. Tom Ward. This survey was requested to evaluate the effectiveness of humidity control measures implemented since 2010.

A visual examination of the elementary wing noted dirty air filters in the unit ventilators. Indoor air quality monitors were placed in three of the rooms to evaluate the temperature, relative humidity, and carbon dioxide levels. Temperature and relative humidity were within recommended levels. However, carbon dioxide levels were marginal in the preschool area and elevated in the alternative kindergarten and kindergarten north classrooms. The outdoor air intakes were closed to better control the heat and humidity experienced during late August. These control measures were effective in controlling mold growth in the classrooms, but increased the carbon dioxide levels.

Air samples were collected in the five classrooms to evaluate the presence of mold spores. Indoor spore levels were below the EMC benchmark and similar to the spores indentified in the outdoor samples.

The following recommendations are designed to improve the general indoor air quality in the building. If the following recommendations fail to eliminate the mold growth, please contact EMC for further investigation.

Recommendations

1. **Relative Humidity Control Practices:** The current practice of operating a dehumidifier in each room and closing outside air louvers during unoccupied periods has been effective in controlling the relative humidity and eliminating mold growth. These practices should be continued during warm, humid conditions.

2. **Increase Outdoor Air:** The carbon dioxide levels were above American National Standards Institute (ANSI) and American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) recommended guideline in two rooms. This is due to the relative humidity control measures currently in effect. The outdoor air louvers should be opened as the temperature and relative humidity moderate.

3. **HVAC Air Filters:** Air filters with significant build-up and an unknown minimum efficiency reporting value (MERV) were installed in the classroom unit ventilators. As a good indoor air quality practice, properly fitted, pleated or treated mesh air filters with a MERV of at least 8 should be installed. This decreases the introduction of mold spores and outside allergens into the building through the HVAC system and decreases dirt and debris accumulation inside the system. These filters should be checked monthly and changed as needed or at least quarterly.

Background

An indoor air quality and mold investigation was conducted on August 28, 2013, in Manning Elementary at the request of Dr. Tom Ward. Due to high relative humidity, the elementary wing experienced mold growth on carpeting in 2010. The mold was remediated and dehumidifiers were installed to help control humidity. The goal of this survey was to evaluate the effectiveness of humidity control measures implemented since 2010.

Results and Discussion

Photographic documentation of the sampling and additional observations is included in Appendix A.

Water Intrusion/Moisture

No water intrusion was reported or observed. Dehumidifiers were installed and operating in all occupied classrooms.

Heating, Ventilating and Air Conditioning Units (HVAC)

Each classroom is serviced by unit ventilators using geothermal cooling and heating. The outside air louvers were closed during the survey. The air filters in the unit ventilators appeared dirty. For improved air filtration, the HVAC air filter recommendation should be followed.

All rooms had operating ceiling fans which were on during the survey.

Sampling Data

The sampling results are only representative of those conditions present during the collection of the samples. An explanation of the fungi sampling strategy and sampling data interpretation used during the investigation is available upon request. Analytical results are included in Appendix B.

Fungi - Spore Trap Air Samples

Seven spore trap air samples were collected (five indoor and two outdoor for comparison) to provide a snapshot of the mold spore levels in the air at the time of sampling. The first outdoor air sample was collected prior to entering the building to begin the investigation. The second outdoor air sample was collected at the conclusion of the investigation. They were collected for 5 minutes each using Allergenco-D sampling cassettes connected to a Quick Take 30 sampling pump calibrated at 15 liters per minute (lpm). There are no federal or state regulatory standards for airborne mold spores and components.

Table 1: Spore Trap Air Samples

Area/Room	No. of Spore Types	Total Spore Count (Spores/m^3)	Within Typical Outdoor Data
Outsidoors by South Entrance	10	8,600	Yes
Preschool	4	290	Yes
Kindergarten North	3	80	Yes
Alternative Kindergarten	1	53	Yes
Kindergarten 108	2	120	Yes
Library	2	27	Yes
Outdoors on East Playground	10	3,900	Yes

The outdoor spore trap air samples were within statistical data range for the time of year in Iowa. The indoor spore trap air sample results were below EMC's recommended benchmark of less than 900 spores/m^3 of air. The indoor spore types were similar to those identified outdoors indicating the indoor spores likely originated from an outdoor source.

Indoor Air Quality Monitoring

Three calibrated GrayWolf indoor air quality (IAQ) monitors were placed in rooms to monitor carbon dioxide (CO_2-parts per million, ppm), temperature and relative humidity (RH) during the survey. An explanation of standards and guidelines for carbon dioxide, temperature and relative humidity is available upon request.

Table 2: IAQ Data Summary

Location Description	Average CO_2 (ppm)	Maximum CO_2 (ppm)	Minimum CO_2 (ppm)	Average Relative Humidity (%)	Average Temperature (°F)
Preschool	981	996	965	43	75
Kindergarten North	1115	1185	992	42	77
Alternative Kindergarten	1469	1503	1434	40	77

The average carbon dioxide readings in two of the rooms monitored were greater than the ANSI and ASHRAE recommended guideline of 1,040 ppm (outside background concentration plus 700 ppm). The survey was conducted immediately after classes were released for the day. This should be a near worst-case scenario for carbon dioxide levels. Currently, the classrooms receive limited outdoor air supply to moderate the CO_2 level and reduce indoor air pollutants because the outside air louvers are closed. Refer to the outdoor air recommendation for information on reducing carbon dioxide levels in the rooms.

The relative humidity levels in the rooms were within the ANSI/ASHRAE recommended guidelines of less than 50 percent. This indicates that the relative humidity measures implemented since 2010 are effective. Keeping relative humidity levels below 60 percent should minimize mold growth on carpets and other material.

The result of closing the outdoor air damper assisted in controlling moisture, but has increased the carbon dioxide level in the rooms. As temperatures cool and relative humidity lowers, the outside air dampers can be opened during occupied periods. Refer to the humidity control practices recommendation for additional information.

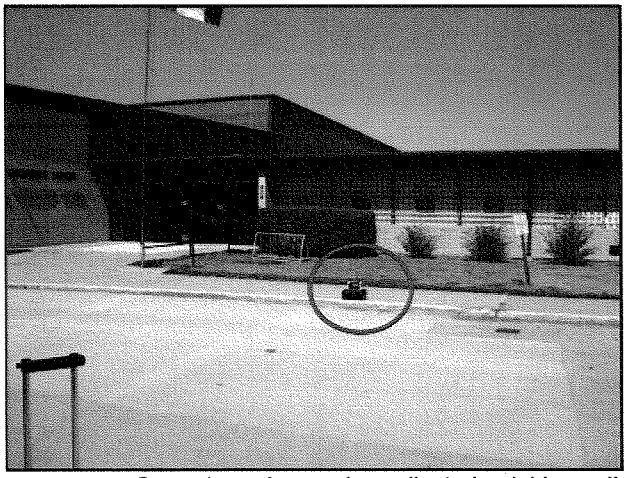
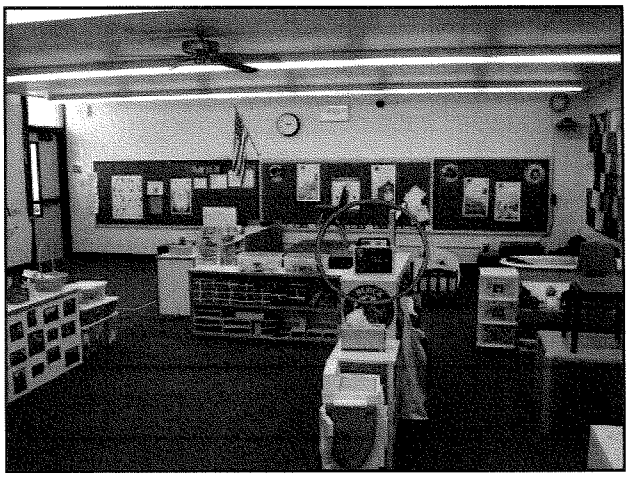
The temperature readings in the classrooms were within the ANSI/ASHRAE recommended guidelines. Temperature should range between 68° to 80°F for thermal comfort. Optimal temperature set points should be in the 72° to 74°F range.

Appendix A

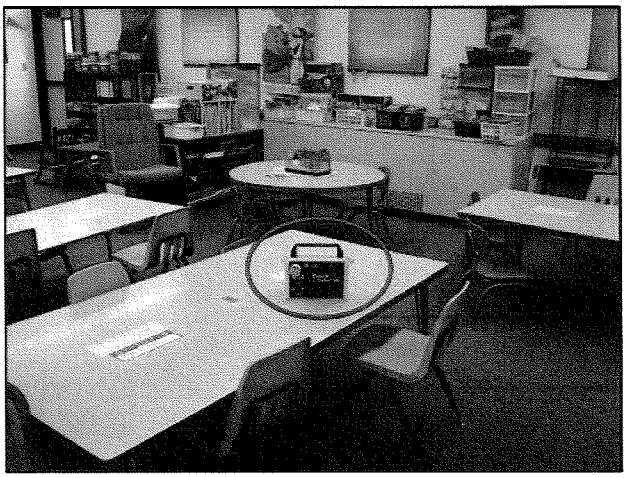
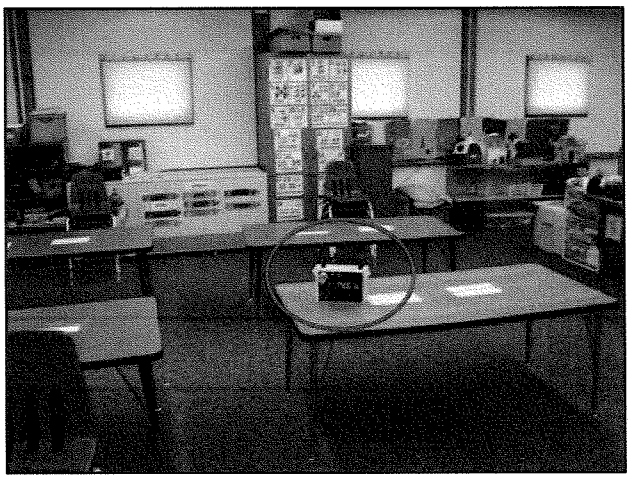
Monitoring – Photographs

Observations/Sampling

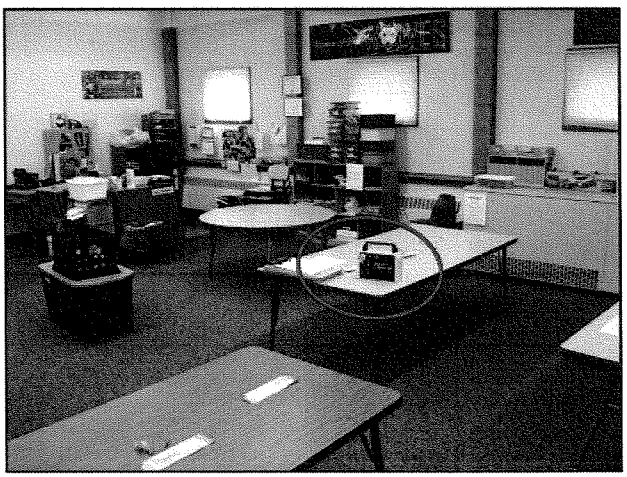
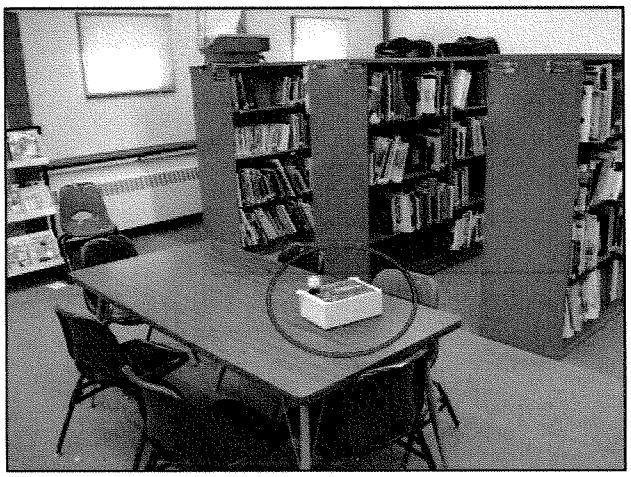
Spore Trap Air Samples

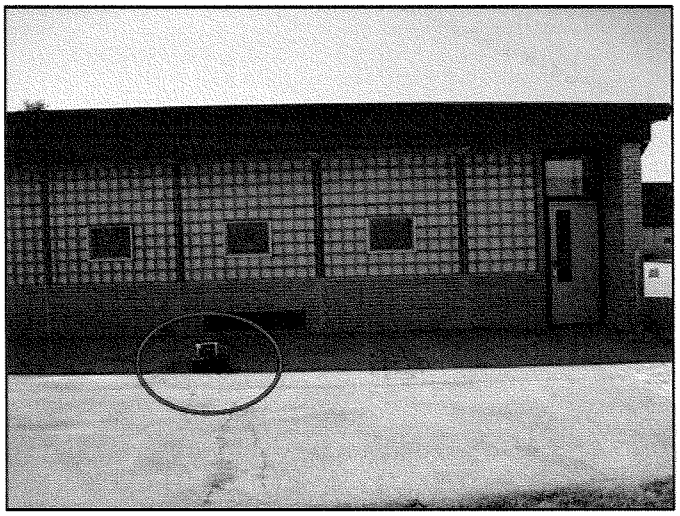
Spore trap air samples collected outside south entrance (left) and in the preschool room (right)

Spore trap air samples collected in kindergarten north (left) and alternative kindergarten room 107 (right)

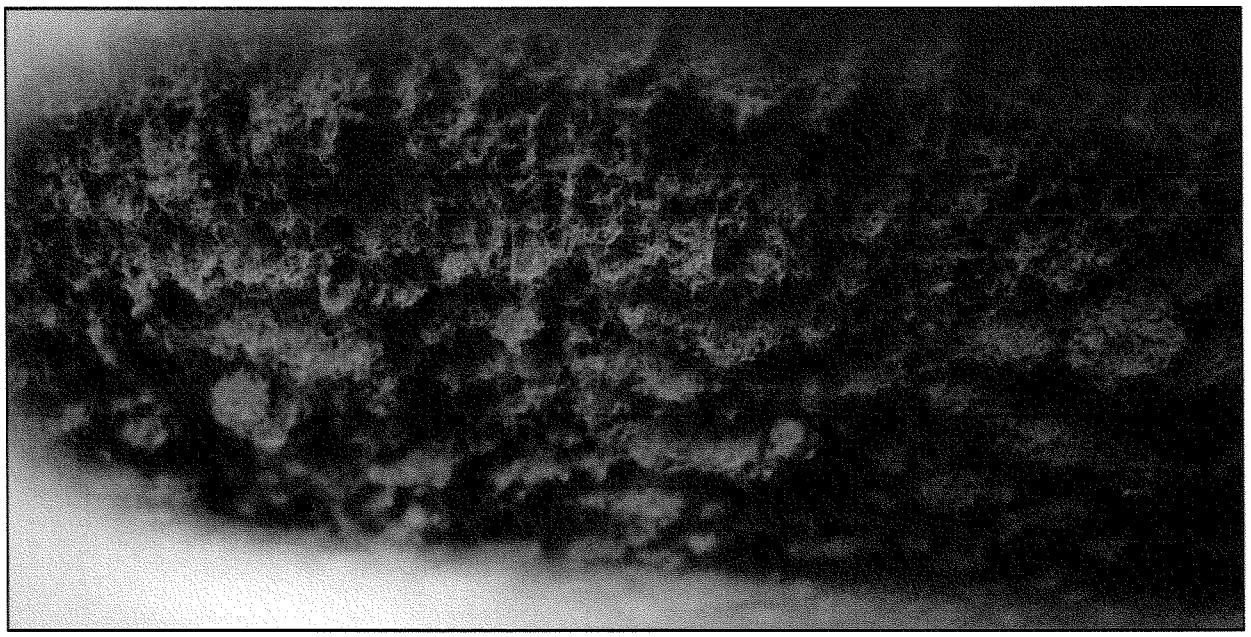



Spore trap air samples collected in kindergarten room 108 (left) and the library (right)

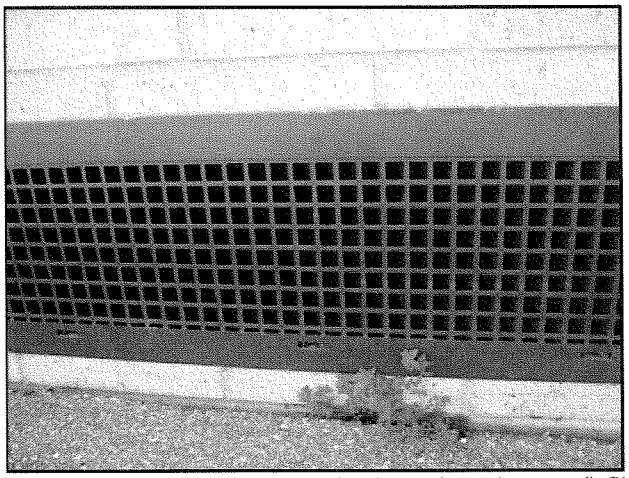
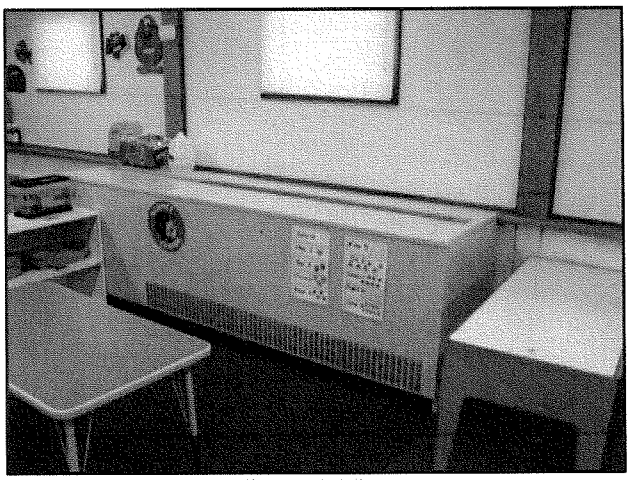


Spore trap air sample collected from the asphalt playground on the east side of the school

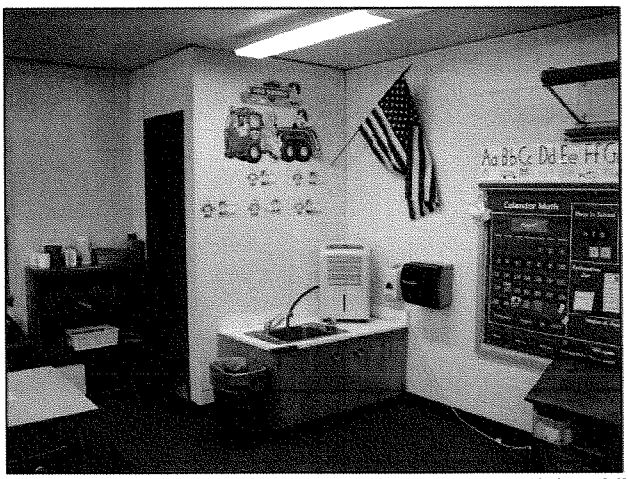
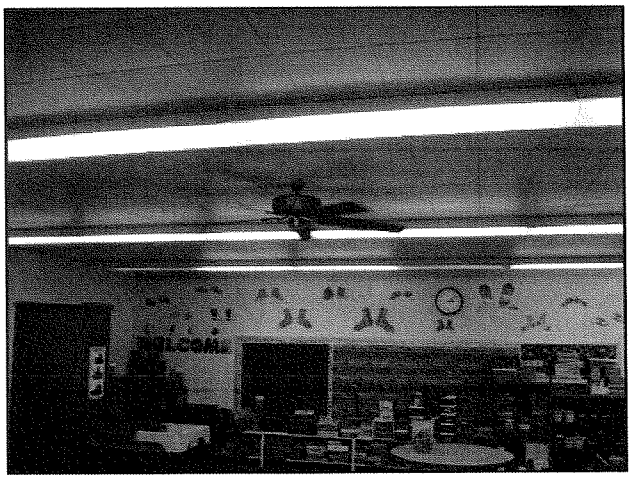
Additional Observations



Air filter

Closed unit ventilator louvers (left) and preschool unit ventilator (right)

Kindergarten north dehumidifier (left) and ceiling fan (right)

Appendix B

Analytical Results

EMLab P&K
A TestAmerica Company

Report for:

Mr. Dave Havick, CIH
EMC Insurance Companies
717 Mulberry - E10S
Des Moines, IA 50309

Regarding: Project: IKM Manning CSD; Manning Elementary
EML ID: 1106846

Approved by:

Technical Manager
Dr. Kamashwaran Ramanathan

Dates of Analysis:
Spore trap analysis: 09-03-2013

Service SOPs: Spore trap analysis (1038)
AIHA-LAP, LLC accredited service, Lab ID #102856

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the items tested.

EMLab P&K ("the Company") shall have no liability to the client or the client's customer with respect to decisions or recommendations made, actions taken or courses of conduct implemented by either the client or the client's customer as a result of or based upon the Test Results. In no event shall the Company be liable to the client with respect to the Test Results except for the Company's own willful misconduct or gross negligence nor shall the Company be liable for incidental or consequential damages or lost profits or revenues to the fullest extent such liability may be disclaimed by law, even if the Company has been advised of the possibility of such damages, lost profits or lost revenues. In no event shall the Company's liability with respect to the Test Results exceed the amount paid to the Company by the client therefor.

EMLab P&K
1150 Bayhill Drive, Suite 100, San Bruno, CA 94066
(866) 888-6653 Fax (650) 829-5852 www.emlab.com

Client: EMC Insurance Companies
C/O: Mr. Dave Havick, CIH
Re: IKM Manning CSD; Manning Elementary

Date of Sampling: 08-28-2013
Date of Receipt: 08-30-2013
Date of Report: 09-03-2013

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	489193: 01 - Outside south elem entrance		489233: 02 - Preschool Room		489223: 03 - Kindergarten North		489209: 04 - Alternative Kindergarten 107	
Comments (see below)	None		None		None		None	
Lab ID-Version‡:	4992749-1		4992750-1		4992751-1		4992752-1	
Analysis Date:	09/03/2013		09/03/2013		09/03/2013		09/03/2013	
	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria	14	190						
Ascospores	8	430						
Basidiospores	18	960						
Bipolaris/Drechslera group	1	13						
Cercospora	2	27						
Chaetomium								
Cladosporium	128	6,800	4	210	1	53	1	53
Epicoccum	1	13			1	13		
Oidium								
Other brown								
Other colorless								
Penicillium/Aspergillus types†			1	53				
Pithomyces	1	13	1	13				
Rusts					1	13		
Smuts, Periconia, Myxomycetes	6	80	1	13				
Stachybotrys								
Stemphylium								
Torula	6	80						
Ulocladium								
Zygomycetes								
Background debris (1-4+)††	3+		2+		2+		2+	
Hyphal fragments/m3	160		27		13		13	
Pollen/m3	320		< 13		< 13		< 13	
Skin cells (1-4+)	< 1+		1+		1+		1+	
Sample volume (liters)	75		75		75		75	
§ TOTAL SPORES/m3		8,600		290		80		53

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample.
† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium, Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.
††Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher then reported. It is important to account for samples volumes when evaluating dust levels.

The analytical sensitivity is the spores/m3 divided by the raw count. The limit of detection is the analytical sensitivity multiplied by the sample volume divided by 1000.

For more information regarding analytical sensitivity, please contact QA by calling the laboratory.
‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

EMLab P&K
1150 Bayhill Drive, Suite 100, San Bruno, CA 94066
(866) 888-6653 Fax (650) 829-5852 www.emlab.com

Client: EMC Insurance Companies
C/O: Mr. Dave Havick, CIH
Re: IKM Manning CSD; Manning Elementary

Date of Sampling: 08-28-2013
Date of Receipt: 08-30-2013
Date of Report: 09-03-2013

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	489220: 05 - Kindergarten 108		489230: 06 - Library		606703: 07 - Outside East Playground area	
Comments (see below)	None		None		None	
Lab ID-Version‡:	4992753-1		4992754-1		4992755-1	
Analysis Date:	09/03/2013		09/03/2013		09/03/2013	
	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria	1	13	1	13	21	280
Ascospores					9	480
Basidiospores					8	430
Bipolaris/Drechslera group						
Cercospora						
Chaetomium						
Cladosporium	2	110			47	2,500
Epicoccum					1	13
Oidium					1	13
Other brown					1	13
Other colorless						
Penicillium/Aspergillus types†						
Pithomyces					2	27
Rusts					2	27
Smuts, Periconia, Myxomycetes			1	13	5	67
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Zygomycetes						
Background debris (1-4+)††	2+		2+		3+	
Hyphal fragments/m3	< 13		< 13		150	
Pollen/m3	< 13		< 13		350	
Skin cells (1-4+)	1+		1+		< 1+	
Sample volume (liters)	75		75		75	
§ TOTAL SPORES/m3		120		27		3,900

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample.
† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium, Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.
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For more information regarding analytical sensitivity, please contact QA by calling the laboratory.
‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

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Client: EMC Insurance Companies
C/O: Mr. Dave Havick, CIH
Re: IKM Manning CSD; Manning Elementary

Date of Sampling: 08-28-2013
Date of Receipt: 08-30-2013
Date of Report: 09-03-2013

MoldRANGE™: Extended Outdoor Comparison

Outdoor Location: 489193, 01 - Outside south elem entrance

Fungi Identified	Outdoor data	Typical Outdoor Data for: August in Iowa† (n‡=380)						Typical Outdoor Data for: The entire year in Iowa† (n‡=2398)					
	spores/m3	very low	low	med	high	very high	freq %	very low	low	med	high	very high	freq %
Generally able to grow indoors*													
Alternaria	190	40	67	170	440	790	96	13	27	100	320	590	72
Bipolaris/Drechslera group	13	7	7	13	27	53	23	7	11	13	31	53	16
Chaetomium	-	-	-	-	-	-	3	7	7	13	17	27	4
Cladosporium	6,800	960	1,400	3,900	10,000	18,000	99	110	270	1,600	5,400	10,000	93
Curvularia	-	7	13	13	33	67	34	7	13	13	40	67	16
Epicoccum	13	13	13	27	80	120	66	13	13	40	120	220	56
Nigrospora	-	13	13	20	53	93	53	7	13	26	67	120	31
Other brown	-	7	13	20	33	57	19	7	13	13	40	53	18
Penicillium/Aspergillus types	-	53	80	240	770	1,300	61	40	53	160	550	1,000	55
Pithomyces	13	13	17	53	170	310	76	7	13	33	110	210	35
Stachybotrys	-	-	-	-	-	-	< 1	7	7	13	20	43	< 1
Torula	80	7	13	27	81	110	22	7	13	25	53	86	13
Seldom found growing indoors**													
Ascospores	430	270	480	1,300	3,300	5,600	99	53	130	640	2,400	4,200	81
Basidiospores	960	590	960	3,100	7,800	13,000	99	75	200	1,200	4,400	8,300	90
Cercospora	27	13	27	80	220	350	68	13	18	60	190	330	34
Oidium	-	7	7	13	40	53	15	7	7	13	53	80	13
Rusts	-	13	13	27	80	130	61	13	13	33	99	200	40
Smuts, Periconia, Myxomycetes	80	13	13	53	140	270	74	13	20	60	200	370	69
§ TOTAL SPORES/m3	8,600												

†The 'Typical Outdoor Data' represents the typical outdoor spore levels for the location and time frame indicated. The last column represents the frequency of occurrence. The very low, low, med, high, and very high values represent the 10, 20, 50, 80, and 90 percentile values of the spore type when it is detected. For example, if the frequency of occurrence is 63% and the low value is 53, it would mean that the given spore type is detected 63% of the time and, when detected, 20% of the time it is present in levels above the detection limit and below 53 spores/m3. These values are updated periodically, and if enough data is not available to make a statistically meaningful assessment, it is indicated with a dash.

§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

* The spores in this category are generally capable of growing on wet building materials in addition to growing outdoors. Building related growth is dependent upon the fungal type, moisture level, type of material, and other factors. *Cladosporium* is one of the predominant spore types worldwide and is frequently present in high numbers. *Penicillium/Aspergillus* species colonize both outdoor and indoor wet surfaces rapidly and are very easily dispersed. Other genera are usually present in lesser numbers.
** These fungi are generally not found growing on wet building materials. For example, the rusts and smuts are obligate plant pathogens. However, in each group there are notable exceptions. For example, agents of wood decay are members of the basidiomycetes and high counts of a single morphological type of basidiospore on an inside sample should be considered significant.

‡n = number of samples used to calculate data.

Interpretation of the data contained in this report is left to the client or the persons who conducted the field work. This report is provided for informational and comparative purposes only and should not be relied upon for any other purpose. "Typical outdoor data" are based on the results of the analysis of samples delivered to and analyzed by EMLab P&K and assumptions regarding the origins of those samples. Sampling techniques, contaminants infecting samples, unrepresentative samples and other similar or dissimilar factors may affect these results. In addition, EMLab P&K may not have received and tested a representative number of samples for every region or time period. EMLab P&K hereby disclaims any liability for any and all direct, indirect, punitive, incidental, special or consequential damages arising out of the use or interpretation of the data contained in, or any actions taken or omitted in reliance upon, this report.

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Client: EMC Insurance Companies
C/O: Mr. Dave Havick, CIH
Re: IKM Manning CSD; Manning Elementary

Date of Sampling: 08-28-2013
Date of Receipt: 08-30-2013
Date of Report: 09-03-2013

MoldRANGE™: Extended Outdoor Comparison

Outdoor Location: 606703, 07 - Outside East Playground area

Fungi Identified	Outdoor data	Typical Outdoor Data for: August in Iowa† (n‡=380)						Typical Outdoor Data for: The entire year in Iowa† (n‡=2398)					
	spores/m3	very low	low	med	high	very high	freq %	very low	low	med	high	very high	freq %
Generally able to grow indoors*													
Alternaria	280	40	67	170	440	790	96	13	27	100	320	590	72
Bipolaris/Drechslera group	-	7	7	13	27	53	23	7	11	13	31	53	16
Chaetomium	-	-	-	-	-	-	3	7	7	13	17	27	4
Cladosporium	2,500	960	1,400	3,900	10,000	18,000	99	110	270	1,600	5,400	10,000	93
Curvularia	-	7	13	13	33	67	34	7	13	13	40	67	16
Epicoccum	13	13	13	27	80	120	66	13	13	40	120	220	56
Nigrospora	-	13	13	20	53	93	53	7	13	26	67	120	31
Other brown	13	7	13	20	33	57	19	7	13	13	40	53	18
Penicillium/Aspergillus types	-	53	80	240	770	1,300	61	40	53	160	550	1,000	55
Pithomyces	27	13	17	53	170	310	76	7	13	33	110	210	35
Stachybotrys	-	-	-	-	-	-	< 1	7	7	13	20	43	< 1
Torula	-	7	13	27	81	110	22	7	13	25	53	86	13
Seldom found growing indoors**													
Ascospores	480	270	480	1,300	3,300	5,600	99	53	130	640	2,400	4,200	81
Basidiospores	430	590	960	3,100	7,800	13,000	99	75	200	1,200	4,400	8,300	90
Cercospora	-	13	27	80	220	350	68	13	18	60	190	330	34
Oidium	13	7	7	13	40	53	15	7	7	13	53	80	13
Rusts	27	13	13	27	80	130	61	13	13	33	99	200	40
Smuts, Periconia, Myxomycetes	67	13	13	53	140	270	74	13	20	60	200	370	69
§ TOTAL SPORES/m3	3,900												

†The 'Typical Outdoor Data' represents the typical outdoor spore levels for the location and time frame indicated. The last column represents the frequency of occurrence. The very low, low, med, high, and very high values represent the 10, 20, 50, 80, and 90 percentile values of the spore type when it is detected. For example, if the frequency of occurrence is 63% and the low value is 53, it would mean that the given spore type is detected 63% of the time and, when detected, 20% of the time it is present in levels above the detection limit and below 53 spores/m3. These values are updated periodically, and if enough data is not available to make a statistically meaningful assessment, it is indicated with a dash.

§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

* The spores in this category are generally capable of growing on wet building materials in addition to growing outdoors. Building related growth is dependent upon the fungal type, moisture level, type of material, and other factors. *Cladosporium* is one of the predominant spore types worldwide and is frequently present in high numbers. *Penicillium/Aspergillus* species colonize both outdoor and indoor wet surfaces rapidly and are very easily dispersed. Other genera are usually present in lesser numbers.
** These fungi are generally not found growing on wet building materials. For example, the rusts and smuts are obligate plant pathogens. However, in each group there are notable exceptions. For example, agents of wood decay are members of the basidiomycetes and high counts of a single morphological type of basidiospore on an inside sample should be considered significant.

‡n = number of samples used to calculate data.

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EMLab P&K
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(866) 888-6653 Fax (650) 829-5852 www.emlab.com

Client: EMC Insurance Companies
C/O: Mr. Dave Havick, CIH
Re: IKM Manning CSD; Manning Elementary

Date of Sampling: 08-28-2013
Date of Receipt: 08-30-2013
Date of Report: 09-03-2013

MoldSTAT™: Supplementary Statistical Spore Trap Report

Outdoor Summary: 489193: 01 - Outside south elem entrance

Species detected	Outdoor sample spores/m3 <100 1K 10K >100K	Typical outdoor ranges (North America)	Freq. %
Alternaria	190	7 - 33 - 590	46
Ascospores	430	13 - 200 - 5,700	76
Basidiospores	960	13 - 450 - 23,000	92
Bipolaris/Drechslera group	13	7 - 13 - 250	16
Cercospora	27	7 - 27 - 510	13
Cladosporium	6,800	27 - 480 - 10,000	91
Epicoccum	13	7 - 20 - 330	25
Penicillium/Aspergillus types	< 13	13 - 170 - 2,700	68
Pithomyces	13	7 - 20 - 570	15
Smuts, Periconia, Myxomycetes	80	7 - 53 - 960	64
Torula	80	7 - 13 - 180	9
Total	8,600		

The "Typical outdoor ranges" and "Freq. %" columns show the typical low, medium, and high spore counts per cubic meter and the frequency of occurrence for the given spore type. The low, medium, and high values represent the 2.5, 50, and 97.5 percentile values when the spore type is detected. For example, if the low value is 53 and the frequency of occurence is 63%, it would mean that we typically detect the given spore type on 63 percent of all outdoor samples and, when detected, 2.5% of the time it is present in levels below 53 spores/m3.

Indoor Samples

Location: 489233: 02 - Preschool Room

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 3%	dF: 4 Result: 2.9714 Critical value: 9.4877 Inside Similar: Yes	Result: 0.4286	dF: 11 Result: 0.0841 Critical value: 0.5273 Outside Similar: No	Score: 108 Result: Low

Species Detected	Spores/m3 <100 1K 10K >100K
Cladosporium	210
Penicillium/Aspergillus types	53
Pithomyces	13
Smuts, Periconia, Myxomycetes	13
Total	290

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Re: IKM Manning CSD; Manning Elementary

Date of Sampling: 08-28-2013
Date of Receipt: 08-30-2013
Date of Report: 09-03-2013

MoldSTAT™: Supplementary Statistical Spore Trap Report

Location: 489223: 03 - Kindergarten North

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: < 1%	dF: 4 Result: 2.9714 Critical value: 9.4877 Inside Similar: Yes	Result: 0.3077	dF: 11 Result: 0.1364 Critical value: 0.5273 Outside Similar: No	Score: 105 Result: Low

Species Detected	Spores/m3 <100	1K	10K	>100K
Cladosporium				53
Epicoccum				13
Rusts				13
Total				80

Location: 489209: 04 - Alternative Kindergarten 107

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: < 1%	dF: 4 Result: 2.9714 Critical value: 9.4877 Inside Similar: Yes	Result: 0.1818	dF: 10 Result: 0.6515 Critical value: 0.5515 Outside Similar: Yes	Score: 101 Result: Low

Species Detected	Spores/m3 <100	1K	10K	>100K
Cladosporium				53
Total				53

Location: 489220: 05 - Kindergarten 108

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 1%	dF: 4 Result: 2.9714 Critical value: 9.4877 Inside Similar: Yes	Result: 0.3333	dF: 10 Result: 0.6515 Critical value: 0.5515 Outside Similar: Yes	Score: 104 Result: Low

Species Detected	Spores/m3 <100	1K	10K	>100K
Alternaria				13
Cladosporium				110
Total				120

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Date of Sampling: 08-28-2013
Date of Receipt: 08-30-2013
Date of Report: 09-03-2013

MoldSTAT™: Supplementary Statistical Spore Trap Report

Location: 489230: 06 - Library

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: < 1%	dF: 4 Result: 2.9714 Critical value: 9.4877 Inside Similar: Yes	Result: 0.3333	dF: 10 Result: 0.3636 Critical value: 0.5515 Outside Similar: No	Score: 107 Result: Low

Species Detected	Spores/m3 <100 1K 10K >100K
Alternaria	13
Smuts, Periconia, Myxomycetes	13
Total	27

* The Friedman chi-square statistic is a non-parametric test that examines variation in a set of data (in this case, all indoor spore counts). The null hypothesis (H0) being tested is that there is no meaningful difference in the data for all indoor locations. The alternative hypothesis (used if the test disproves the null hypothesis) is that there is a difference between the indoor locations. The null hypothesis is rejected when the result of the test is greater than the critical value. The critical value that is displayed is based on the degrees of freedom (dF) of the test and a significance level of 0.05.

** An agreement ratio is a simple method for assessing the similarity of two samples (in this case the indoor sample and the outdoor summary) based on the spore types present. A score of one indicates that the types detected in one location are the same as that in the other. A score of zero indicates that none of the types detected indoors are present outdoors. Typically, an agreement of 0.8 or higher is considered high.

*** The Spearman rank correlation is a non-parametric test that examines correlation between two sets of data (in this case the indoor location and the outdoor summary). The null hypothesis (H0) being tested is that the indoor and outdoor samples are unrelated. The alternative hypothesis (used if the test disproves the null hypothesis) is that the samples are similar. The null hypothesis is rejected when the result of the test is greater than the critical value. The critical value that is displayed is based on the degrees of freedom (dF) of the test and a significance level of 0.05.

**** MoldSCORE™ is a specialized method for examining air sampling data. It is a score between 100 and 300, with 100 indicating a greater likelihood that the airborne indoor spores originated from the outside, and 300 indicating a greater likelihood that they originated from an inside source. The Result displayed is based on the numeric score given and will be either Low, Medium, or High, indicating a low, medium, or high likelihood that the spores detected originated from an indoor source. EMLab P&Kreserves the right to, and may at anytime, modify or change the MoldScore algorithm without notice.

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Re: IKM Manning CSD; Manning Elementary

Date of Sampling: 08-28-2013
Date of Receipt: 08-30-2013
Date of Report: 09-03-2013

MoldSTAT™: Supplementary Statistical Spore Trap Report

Outdoor Summary: 606703: 07 - Outside East Playground area

Species detected	Outdoor sample spores/m3 <100 1K 10K >100K	Typical outdoor ranges (North America)	Freq. %
Alternaria	280	7 - 33 - 590	46
Ascospores	480	13 - 200 - 5,700	76
Basidiospores	430	13 - 450 - 23,000	92
Cladosporium	2,500	27 - 480 - 10,000	91
Epicoccum	13	7 - 20 - 330	25
Oidium	13	7 - 13 - 230	12
Other brown	13	7 - 13 - 120	24
Penicillium/Aspergillus types	< 13	13 - 170 - 2,700	68
Pithomyces	27	7 - 20 - 570	15
Rusts	27	7 - 20 - 350	20
Smuts, Periconia, Myxomycetes	67	7 - 53 - 960	64
Total	3,900		

The "Typical outdoor ranges" and "Freq. %" columns show the typical low, medium, and high spore counts per cubic meter and the frequency of occurrence for the given spore type. The low, medium, and high values represent the 2.5, 50, and 97.5 percentile values when the spore type is detected. For example, if the low value is 53 and the frequency of occurence is 63%, it would mean that we typically detect the given spore type on 63 percent of all outdoor samples and, when detected, 2.5% of the time it is present in levels below 53 spores/m3.

Indoor Samples

Location: 489233: 02 - Preschool Room

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 7%	dF: 4 Result: 2.9714 Critical value: 9.4877 Inside Similar: Yes	Result: 0.4286	dF: 11 Result: 0.2068 Critical value: 0.5273 Outside Similar: No	Score: 108 Result: Low

Species Detected	Spores/m3 <100 1K 10K >100K
Cladosporium	210
Penicillium/Aspergillus types	53
Pithomyces	13
Smuts, Periconia, Myxomycetes	13
Total	290

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MoldSTAT™: Supplementary Statistical Spore Trap Report

Location: 489223: 03 - Kindergarten North

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 2%	dF: 4 Result: 2.9714 Critical value: 9.4877 Inside Similar: Yes	Result: 0.4615	dF: 10 Result: 0.2697 Critical value: 0.5515 Outside Similar: No	Score: 105 Result: Low

Species Detected	Spores/m3 <100	1K	10K	>100K
Cladosporium	53			
Epicoccum	13			
Rusts	13			
Total	80			

Location: 489209: 04 - Alternative Kindergarten 107

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 1%	dF: 4 Result: 2.9714 Critical value: 9.4877 Inside Similar: Yes	Result: 0.1818	dF: 10 Result: 0.6515 Critical value: 0.5515 Outside Similar: Yes	Score: 101 Result: Low

Species Detected	Spores/m3 <100	1K	10K	>100K
Cladosporium	53			
Total	53			

Location: 489220: 05 - Kindergarten 108

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 3%	dF: 4 Result: 2.9714 Critical value: 9.4877 Inside Similar: Yes	Result: 0.3333	dF: 10 Result: 0.6515 Critical value: 0.5515 Outside Similar: Yes	Score: 102 Result: Low

Species Detected	Spores/m3 <100	1K	10K	>100K
Alternaria	13			
Cladosporium	110			
Total	120			

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MoldSTAT™: Supplementary Statistical Spore Trap Report

Location: 489230: 06 - Library

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: < 1%	dF: 4 Result: 2.9714 Critical value: 9.4877 Inside Similar: Yes	Result: 0.3333	dF: 10 Result: 0.3939 Critical value: 0.5515 Outside Similar: No	Score: 107 Result: Low

Species Detected	Spores/m3 <100	1K	10K	>100K
Alternaria				13
Smuts, Periconia, Myxomycetes				13
Total				27

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09-03-2013: IKM Manning CSD

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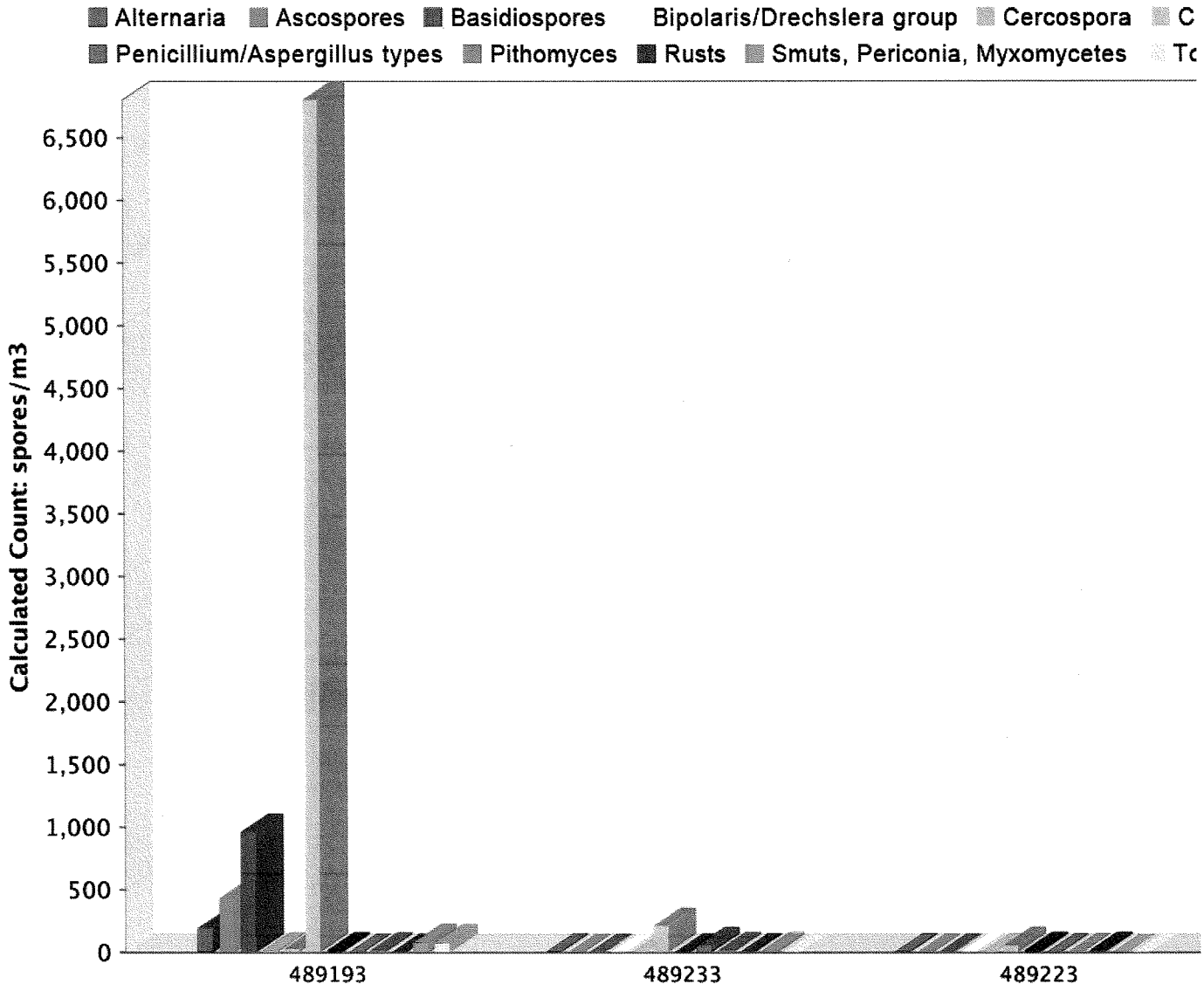
SPORE TRAP REPORT: NON-VIABLE METHODOLOGY



Comments:

Note: Graphical output may understate the importance of certain "marker" genera.
EMLab P&K, LLC

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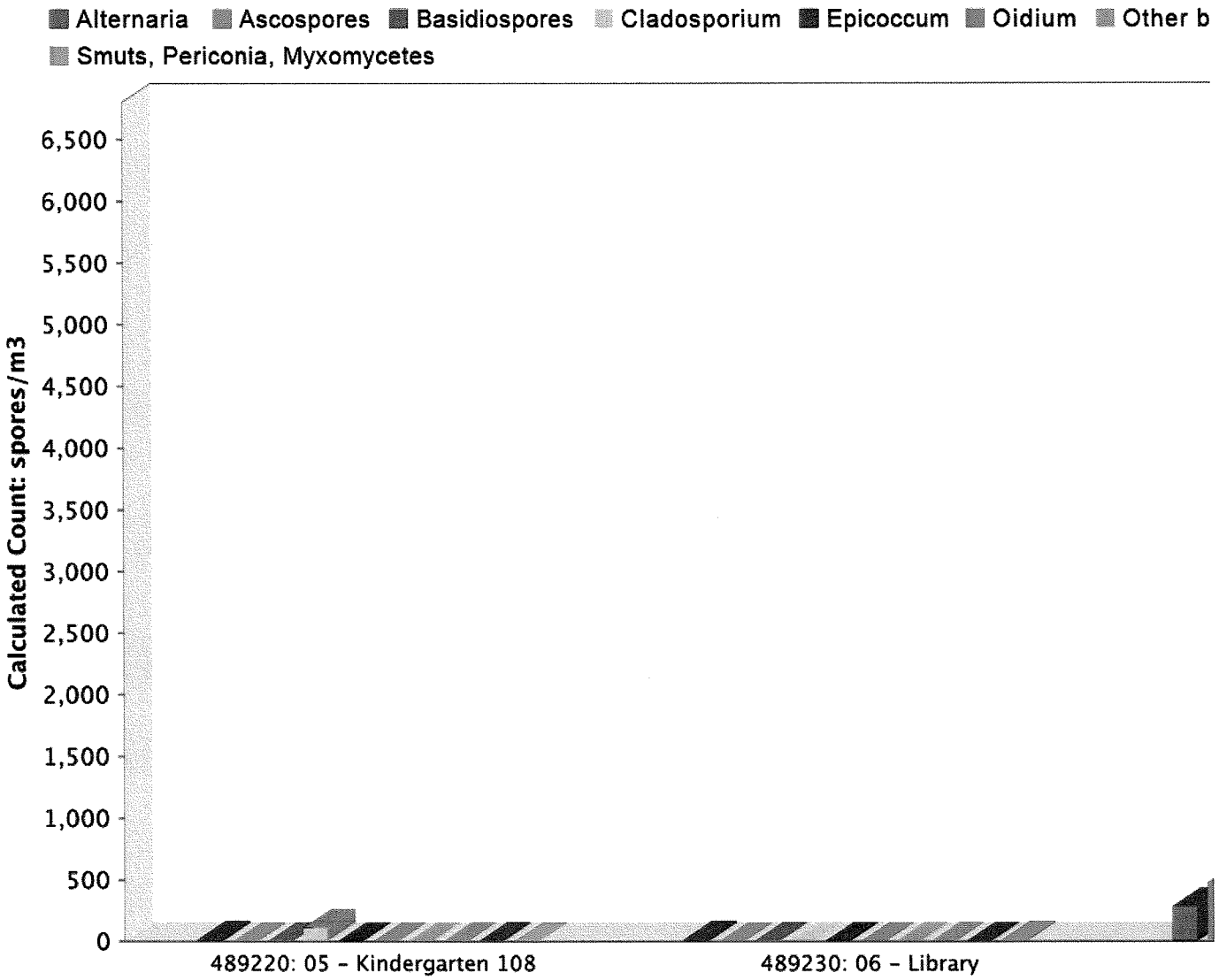
SPORE TRAP REPORT: NON-VIABLE METHODOLOGY



Comments:

Note: Graphical output may understate the importance of certain "marker" genera.
EMLab P&K, LLC