



**Environmental  
Microbiology  
Laboratory, Inc.**

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Report for:


**Mr. Steve Wallstrom**  
**ENVIRONIX**  
20728 56th Ave W  
Lynnwood, WA 98036

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Regarding: Project: Sample report  
EML ID: 123456


Date of Analysis: 02-16-2007

Approved by:

  
Ann Atkinson  
Northeast Lab Manager

  
Dr. Kamashwaran Ramanathan  
Northwest Lab Manager

  
Baluswamy Krishnan  
Southeast Lab Manager

  
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Southwest Lab Manager

Project SOPs: Spore trap analysis (100005)

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This coversheet is included with your report in order to comply with AIHA and ISO accreditation requirements.

For clarity, we report the number of significant digits as calculated; but, due to the nature of this type of biological data, the number of significant digits that is used for interpretation should generally be one or two. 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 corrections of results is not a standard practice. The results relate only to the items tested.

Environmental Microbiology Laboratory, Inc. ("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.

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Document Number: 200091 - Revision Number: 5

Client: ENVIRONIX  
 C/O: Mr. Steve Wallstrom  
 Re: Sample report

Date of Sampling: 02-14-2007  
 Date of Receipt: 02-15-2007  
 Date of Report: 02-16-2007

**SPORE TRAP REPORT: NON-VIABLE METHODOLOGY**

Location:	1: Outside control		2: Office		3: Basement		4: Upstairs	
Comments (see below)	None		None		None		None	
Lab ID-Version‡:	1234567-1		1234567-1		1234567-1		1234567-1	
	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria								
Arthrinium								
Ascospores*	28	373			4	53		
Aureobasidium								
Basidiospores*	72	960	110	1,470	28	373	22	293
Bipolaris/Drechslera group								
Botrytis								
Chaetomium								
Cladosporium	12	160	22	293	40	533		
Curvularia								
Epicoccum								
Fusarium								
Myrothecium								
Nigrospora								
Other brown			2	27	1	13	1	13
Other colorless								
Penicillium/Aspergillus types†	24	320	11,506	153,000	2,156	28,700	88	1,170
Pithomyces								
Rusts*								
Smuts*, Periconia, Myxomycetes*								
Stachybotrys			43	573	2	27		
Stemphylium								
Torula								
Ulocladium								
Unknown								
Zygomycetes								
Background debris (1-4+)††	2+		4+		3+		4+	
Sample volume (liters)	75		75		75		75	
<b>TOTAL SPORES/M3</b>		<b>1,813</b>		<b>155,363</b>		<b>29,699</b>		<b>1,476</b>

**Comments:**

\* Most of these spore types are not seen with culturable methods (Andersen sampling), although some may appear as non-sporulating fungi. Most of the basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.  
 † 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 actually higher than reported. Background debris also affects the reporting limit for some spore types. The reporting limit is dependent on spore size, background debris, sample volume, and the percentage of the trace analyzed. It is important to account for sample volumes when evaluating dust levels. The minimum reporting limit is based on a raw count of one, which is the lowest count that can be detected.  
 ‡ A "Version" greater than 1 indicates amended data.

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	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria								
Arthrinium								
Ascospores*	28	373			4	53		
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Basidiospores*	72	960	110	1,470	28	373	22	293
Bipolaris/Drechslera group								
Botrytis								
Chaetomium								
Cladosporium	12	160	22	293	40	533		
Curvularia								
Epicoccum								
Fusarium								
Myrothecium								
Nigrospora								
Other brown			2	27	1	13	1	13
Other colorless								
Penicillium/Aspergillus types†	24	320	11,506	153,000	2,156	28,700	88	1,170
Pithomyces								
Rusts*								
Smuts*, Periconia, Myxomycetes*								
Stachybotrys			43	573	2	27		
Stemphylium								
Torula								
Ulocladium								
Unknown								
Zygomycetes								
Background debris (1-4+)††	2+		4+		3+		4+	
Hyphal fragments/m3	< 13		53		53		53	
Pollen	< 1+		None		None		< 1+	
Skin cells	< 1+		2+		2+		4+	
Sample volume (liters)	75		75		75		75	
<b>TOTAL SPORES/M3</b>		<b>1,813</b>		<b>155,363</b>		<b>29,699</b>		<b>1,476</b>

**Comments:**

\* Most of these spore types are not seen with culturable methods (Andersen sampling), although some may appear as non-sporulating fungi. Most of the basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.

† 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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**MoldRANGE™: Extended Outdoor Comparison**  
**Outdoor Location: 1, Outside control**

Fungi Identified	Outdoor data	Typical Outdoor Data by Date†				Typical Outdoor Data by Location‡			
		Month: February				State: WA			
	spores/m3	low	med	high	freq %	low	med	high	freq %
<b>Generally able to grow indoors*</b>									
Alternaria	-	7	20	190	38	6	13	410	17
Bipolaris/Drechslera group	-	7	13	150	11	5	13	380	4
Chaetomium	-	7	13	110	8	7	13	67	5
Cladosporium	160	27	320	4,100	91	30	320	5,900	87
Curvularia	-	7	13	400	8	6	13	170	3
Nigrospora	-	7	13	160	8	-	-	-	< 1
Penicillium/Aspergillus types	320	27	160	1,800	85	53	270	3,000	89
Stachybotrys	-	7	13	360	3	5	13	2,000	2
Torula	-	7	13	240	5	7	13	180	6
<b>Seldom found growing indoors**</b>									
Ascospores	373	13	110	2,200	68	37	430	7,800	88
Basidiospores	960	13	270	8,800	87	53	1,600	26,000	97
Rusts	-	7	13	240	13	5	13	280	17
Smuts, Periconia, Myxomycetes	-	7	27	270	57	7	27	420	49
<b>TOTAL SPORES/M3</b>	1,813								

† The Typical Outdoor Data by Date represents the typical outdoor spore levels across North America for the month indicated. The last column represents the frequency of occurrence. The low, medium, and high values represent the 2.5, 50, and 97.5 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, 2.5% 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.

‡ The Typical Outdoor Data by Location represents the typical outdoor spore levels for the region indicated for the entire year. As with the Typical Outdoor Data by Date, the four columns represent the frequency of occurrence and the typical low, medium, and high concentration values for the spore type indicated. These values are updated periodically, and if enough data is not available to make a statistically meaningful assessment, it is indicated with a dash.

\*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.

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 Environmental Microbiology Laboratory, Inc. 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, Environmental Microbiology Laboratory, Inc. may not have received and tested a representative number of samples for every region or time period. Environmental Microbiology Laboratory, Inc. 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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Date of Sampling: 02-14-2007  
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**MoldSTAT™: Supplementary Statistical Spore Trap Report**

**Outdoor Summary: 1: Outside control**

Species detected	Outdoor sample spores/m3				Typical outdoor ranges (North America)	Freq. %
	<100	1K	10K	>100K		
Ascospores				373	13 - 150 - 4,300	76
Basidiospores				960	13 - 320 - 13,000	92
Cladosporium				160	53 - 530 - 7,800	95
Penicillium/Aspergillus types				320	27 - 210 - 2,600	86
Smuts, Periconia, Myxomycetes				ND	7 - 40 - 760	72
<b>Total</b>				1,813		

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 occurrence 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: 2: Office**

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: 8569%	dF: 2 Result: 6.5833 Critical value: 5.9915 Inside Similar: No	Result: 0.6667	dF: 6 Result: 0.2143 Critical value: 0.7714 Outside Similar: No	Score: 300 Result: High	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
	Basidiospores				1,470
	Cladosporium				293
	Other brown				27
	Penicillium/Aspergillus types				153,000
	Stachybotrys				573
	<b>Total</b>				155,363

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**MoldSTAT™: Supplementary Statistical Spore Trap Report**

**Location: 3: Basement**

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: 1638%	dF: 2 Result: 6.5833 Critical value: 5.9915 Inside Similar: No	Result: 0.8000	dF: 6 Result: 0.5286 Critical value: 0.7714 Outside Similar: No	Score: 300 Result: High	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
	Ascospores				53
	Basidiospores				373
	Cladosporium				533
	Other brown				13
	Penicillium/Aspergillus types				28,700
	Stachybotrys				27
	<b>Total</b>				29,699

**Location: 4: Upstairs**

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: 81%	dF: 2 Result: 6.5833 Critical value: 5.9915 Inside Similar: No	Result: 0.5714	dF: 5 Result: 0.2250 Critical value: 0.8000 Outside Similar: No	Score: 230 Result: Medium	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
	Basidiospores				293
	Other brown				13
	Penicillium/Aspergillus types				1,170
	<b>Total</b>				1,476

\* 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.

**Environmental Microbiology Laboratory, Inc.**  
1150 Bayhill Drive, Suite 100, San Bruno, CA 94066  
(650) 829-5800 Fax (650) 829-5852 www.emlab.com

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### **MoldSTAT™: Supplementary Statistical Spore Trap Report**

\*\*\*\* 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 reserves the right to, and may at anytime, modify or change the MoldScore algorithm without notice.

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**MoldSCORE™: Spore Trap Report**

**Outdoor Sample:** 1 Outside control

Fungi Identified	Outdoor sample spores/m3				Raw count	Spores/m3
	<100	1K	10K	>100K		
<b>Generally able to grow indoors*</b>						
Alternaria					ND	< 13
Bipolaris/Drechslera group					ND	< 13
Chaetomium					ND	< 13
Cladosporium	█				12	160
Curvularia					ND	< 13
Nigrospora					ND	< 13
Penicillium/Aspergillus types†	█	█			24	320
Stachybotrys					ND	< 13
Torula					ND	< 13
<b>Seldom found growing indoors**</b>						
Ascospores‡‡	█	█			28	373
Basidiospores‡‡	█	█	█		72	960
Rusts					ND	< 13
Smuts, Periconia, Myxomycetes‡‡					ND	< 13
<b>Total</b>						<b>1,813</b>

**Location:** 2 Office

Fungi Identified	Indoor sample spores/m3				Raw count	Spores/m3
	<100	1K	10K	>100K		
<b>Generally able to grow indoors*</b>						
Alternaria					ND	< 13
Bipolaris/Drechslera group					ND	< 13
Chaetomium					ND	< 13
Cladosporium	█				22	293
Curvularia					ND	< 13
Nigrospora					ND	< 13
Other brown	█				2	27
Penicillium/Aspergillus types†	█	█	█	█	11,506	153,000
Stachybotrys	█	█			43	573
Torula					ND	< 13
<b>Seldom found growing indoors**</b>						
Ascospores‡‡					ND	< 13
Basidiospores‡‡	█	█	█		110	1,470
Rusts					ND	< 13
Smuts, Periconia, Myxomycetes‡‡					ND	< 13
<b>Total</b>						<b>155,363</b>

MoldSCORE‡			Score
100	200	300	
█			100
█			100
█			100
█			109
█			100
█			100
█			111
█	█	█	300
█	█	█	300
█			100
█			100
█	█		162
█			100
█			100
<b>Final MoldSCORE</b>			<b>300</b>



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### **MoldSCORE™: Spore Trap Report**

\*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.

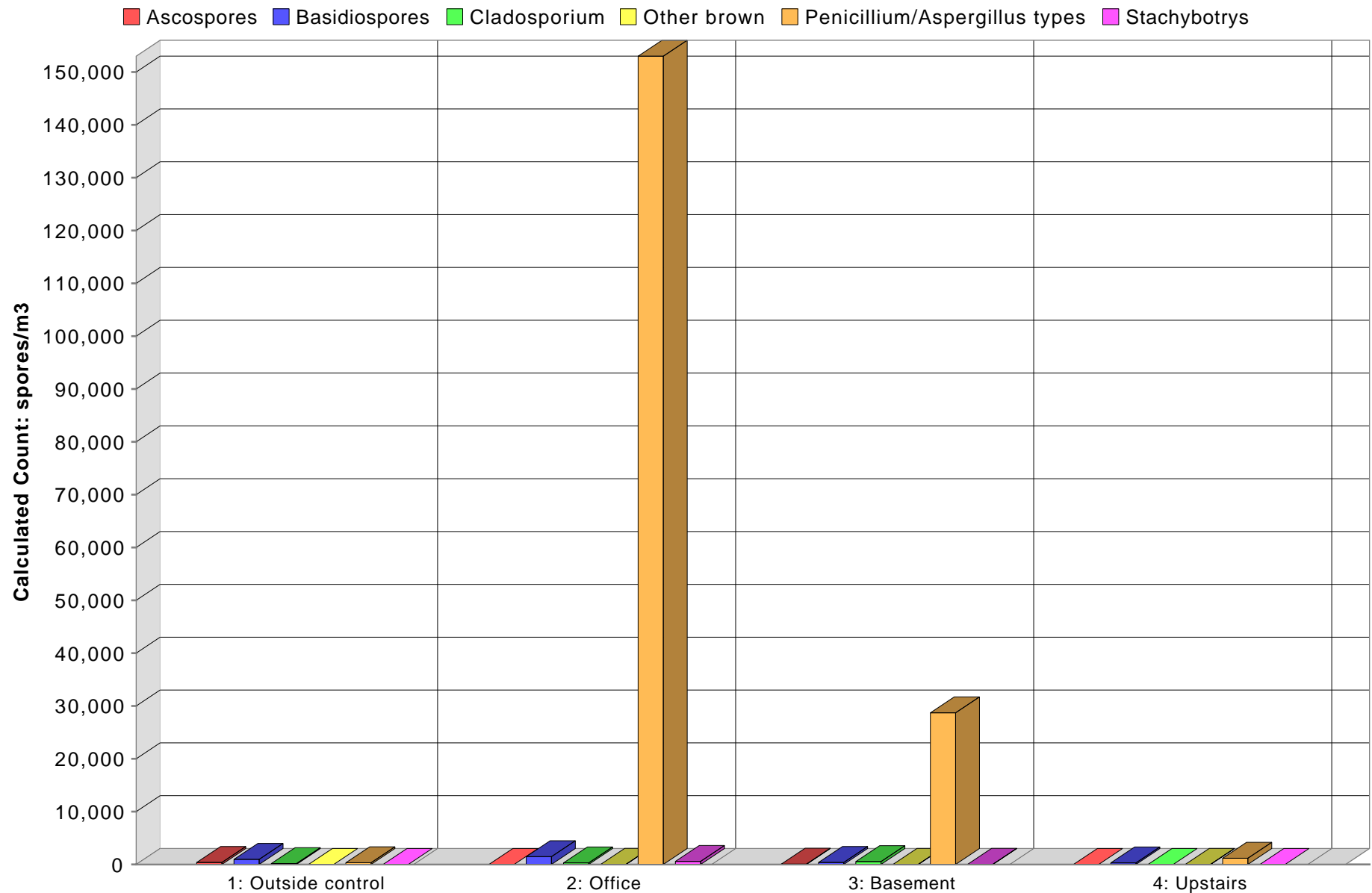
\*\*These fungi are generally not found growing on wet building materials. For example, the rusts and smuts are obligate plant pathogens. However, in each group there are notable exceptions. For example, agents of wood decay are members of the basidiomycetes and high counts of a single morphological type of basidiospore on an inside sample should be considered significant.

†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.

††Most of these spore types are not seen with culturable methods (Anderson sampling), although some may appear as non-sporulating fungi. Most of the basidiospores are "mushroom" spores.

‡Rated on a scale from 100 to 300. A rating less than 150 is low and indicates a low probability of spores originating inside. A rating greater than 250 is high and indicates a high probability that the spores originated from inside, presumably from indoor mold growth. A rating between 150 and 250 indicates a moderate likelihood of indoor fungal growth. MoldSCORE is NOT intended for wall cavity samples. It is intended for ambient air samples in residences. Using the analysis on other samples (like wall cavity samples) will lead to misleading results.

### SPORE TRAP REPORT: NON-VIABLE METHODOLOGY



**Comments:**

Note: Graphical output may understate the importance of certain "marker" genera.