

# SanAir Technologies Laboratory

## Analysis Report

prepared for

**EGIS, Inc.**

Report Date: 8/6/2009  
Project Name: Strafuss  
Project #: 2876.17  
SanAir ID#: 9006838



NVLAP LAB CODE 200870-0



EMPAT# 162952



Certification # 652931



License # LAB0166



804.897.1177

[www.sanair.com](http://www.sanair.com)



# SanAir Technologies Laboratory, Inc.

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Web: <http://www.sanair.com> E-mail: [iaq@sanair.com](mailto:iaq@sanair.com)

**EGIS, Inc.**  
**314 South Main**  
**Bentonville, AR 72712**

August 6, 2009

SanAir ID # 09006838  
Project Name: Strafuss  
Project Number: 2876.17

Dear Ricky Downs,

We at SanAir would like to thank you for the work you recently submitted. The 14 sample(s) were received on Wednesday, August 05, 2009 via FedEx. The final report(s) is enclosed for the following sample(s): S-1, S-2, S-5, S-6, S-7, S-9, S-10, S-11, S-12, S-13, S-14, S-8, S-3, S-4.

These results only pertain to this job and should not be used in the interpretation of any other job.

Sincerely,

A handwritten signature in black ink that reads "L. Claire Macdonald".

L. Claire Macdonald  
Microbiology Laboratory Manager  
SanAir Technologies Laboratory

enclosures:

- Disclaimers and Additional Information

sample conditions:

14 sample(s) in Good condition



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SanAir ID Number

## 09006838

FINAL REPORT

**Name:** EGIS, Inc.  
**Address:** 314 South Main  
Bentonville, AR 72712

**Project Number:** 2876.17  
**P.O. Number:**  
**Project Name:** Strafuss

**Collected Date:** 8/3/2009  
**Received Date:** 8/5/2009 10:45:00 AM  
**Report Date:** 8/6/2009 9:22:15 AM  
**Analyst:** Smith, Holly

## Air Cassette Analysis

ND = None Detected

SanAir ID Number	09006838-001			09006838-002			09006838-005			09006838-006		
Sample Number	S-1			S-2			S-5			S-6		
Sample Identification	Outside Air SN# 15090316			SN# 15090318 Garys Office Air			SN# 15090346 Sewer Dist. Offices			SN# 15090340 Planning Offices		
Sample Type	Air Cassette - Air-O-Cell			Air Cassette - Air-O-Cell			Air Cassette - Air-O-Cell			Air Cassette - Air-O-Cell		
Volume	150 Liters			150 Liters			150 Liters			150 Liters		
Limit of Detection	7 Count/M <sup>3</sup>			7 Count/M <sup>3</sup>			7 Count/M <sup>3</sup>			7 Count/M <sup>3</sup>		
Background Density	2			2+			2			2		
Fungal Identification	Raw Count	Count/M <sup>3</sup>	%	Raw Count	Count/M <sup>3</sup>	%	Raw Count	Count/M <sup>3</sup>	%	Raw Count	Count/M <sup>3</sup>	%
Alternaria species	17	113	2	2	13	4	1	7	11	1	7	4
Ascospores	168	1120	20	7	47	13	1	7	11	1	7	4
Aspergillus/Penicillium	96	640	11	12	80	22	2	13	22	17	113	68
Basidiospores	175	1167	21	2	13	4						
Bipolaris/Drechslera	6	40	< 1	4	27	7				1	7	4
Botrytis species	1	7	< 1									
Cercospora species	16	107	2									
Chaetomium species				2	13	4						
Cladosporium species	310	2067	37	8	53	15	2	13	22	5	33	20
Curvularia species	2	13	< 1	1	7	2	1	7	11			
Epicoccum species	5	33	< 1	2	13	4	1	7	11			
Fusarium species	9	60	1									
Nigrospora species				3	20	6						
Periconia species	3	20	< 1									
Pithomyces species	1	7	< 1	5	33	9	1	7	11			
Polythrincium species	1	7	< 1									
Pyricularia species	1	7	< 1									
Rusts	3	20	< 1									
Smuts/Myxomycetes	20	133	2	6	40	11						
Sporidesmium species	1	7	< 1									
Torula species	4	27	< 1									
Ulocladium species												
Unknown spores	1	7	< 1									
<b>Total Fungi</b>	<b>840</b>	<b>5600</b>		<b>54</b>	<b>360</b>		<b>9</b>	<b>60</b>		<b>25</b>	<b>167</b>	
Other	Raw Count	Count/M <sup>3</sup>	%	Raw Count	Count/M <sup>3</sup>	%	Raw Count	Count/M <sup>3</sup>	%	Raw Count	Count/M <sup>3</sup>	%
Mycelial Fragments	15	100	>99	14	93	>99	5	33	>99	5	33	>99

### Certification

Signature:   
Date: 8/5/2009

Reviewed:   
Date: 8/6/2009





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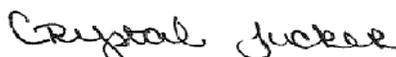
## Air Cassette Analysis

ND = None Detected

SanAir ID Number	09006838-012			09006838-013			09006838-014		
<b>Sample Number</b>	S-12			S-13			S-14		
<b>Sample Identification</b>	SN# 15091340 Pod C			SN# 15092297 Court Room			SN# 15090333 Recorders Office		
<b>Sample Type</b>	Air Cassette - Air-O-Cell			Air Cassette - Air-O-Cell			Air Cassette - Air-O-Cell		
<b>Volume</b>	150 Liters			150 Liters			150 Liters		
<b>Limit of Detection</b>	7 Count/M <sup>3</sup>			7 Count/M <sup>3</sup>			7 Count/M <sup>3</sup>		
<b>Background Density</b>	2			1+			1+		
<b>Fungal Identification</b>	Raw Count	Count/M <sup>3</sup>	%	Raw Count	Count/M <sup>3</sup>	%	Raw Count	Count/M <sup>3</sup>	%
Alternaria species									
Ascospores	3	20	17	1	7	>99	1	7	11
Aspergillus/Penicillium	2	13	11				1	7	11
Basidiospores	3	20	17				4	27	44
Bipolaris/Drechslera									
Botrytis species									
Cercospora species							1	7	11
Chaetomium species									
Cladosporium species	6	40	33				2	13	22
Curvularia species									
Epicoccum species									
Fusarium species									
Nigrospora species									
Periconia species	2	13	11						
Pithomyces species	1	7	6						
Polythrincium species									
Pyricularia species									
Rusts									
Smuts/Myxomycetes	1	7	6						
Sporidesmium species									
Torula species									
Ulocladium species									
Unknown spores									
<b>Total Fungi</b>	<b>18</b>	<b>120</b>		<b>1</b>	<b>7</b>		<b>9</b>	<b>60</b>	
<b>Other</b>	Raw Count	Count/M <sup>3</sup>	%	Raw Count	Count/M <sup>3</sup>	%	Raw Count	Count/M <sup>3</sup>	%
Mycelial Fragments	5	33	>99	1	7	>99			

### Certification

Signature:   
Date: 8/5/2009

Reviewed:   
Date: 8/6/2009



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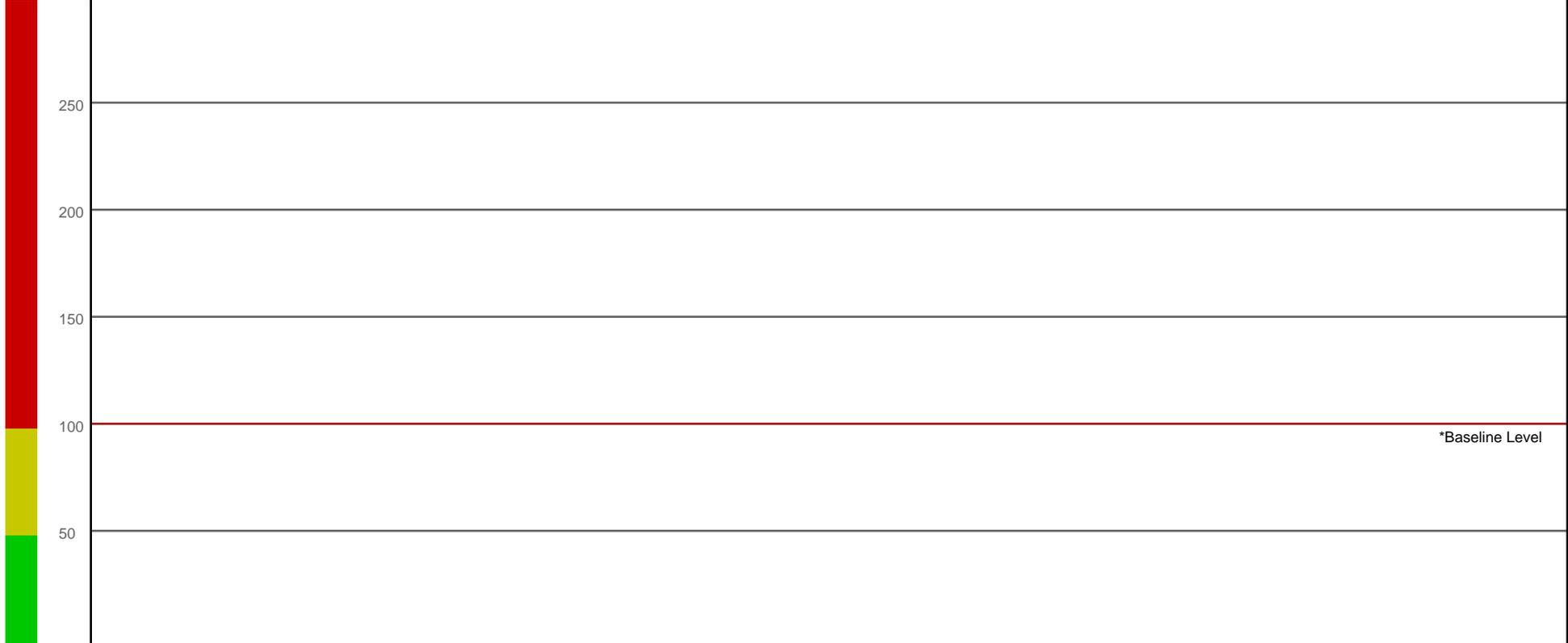
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**Analyst:** Smith, Holly

## Air Cassette Analysis - Spores % of Outside Air

SanAir ID : 9006838-2      Sample # : S-2      ID : SN# 15090318 Garys Office Air



-  Probable mold amplification
-  Possible mold amplification
-  No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

\*The Baseline Level (100%) represents the average baseline sample counts. Counts above the baseline may indicate higher than expected levels of a given result.



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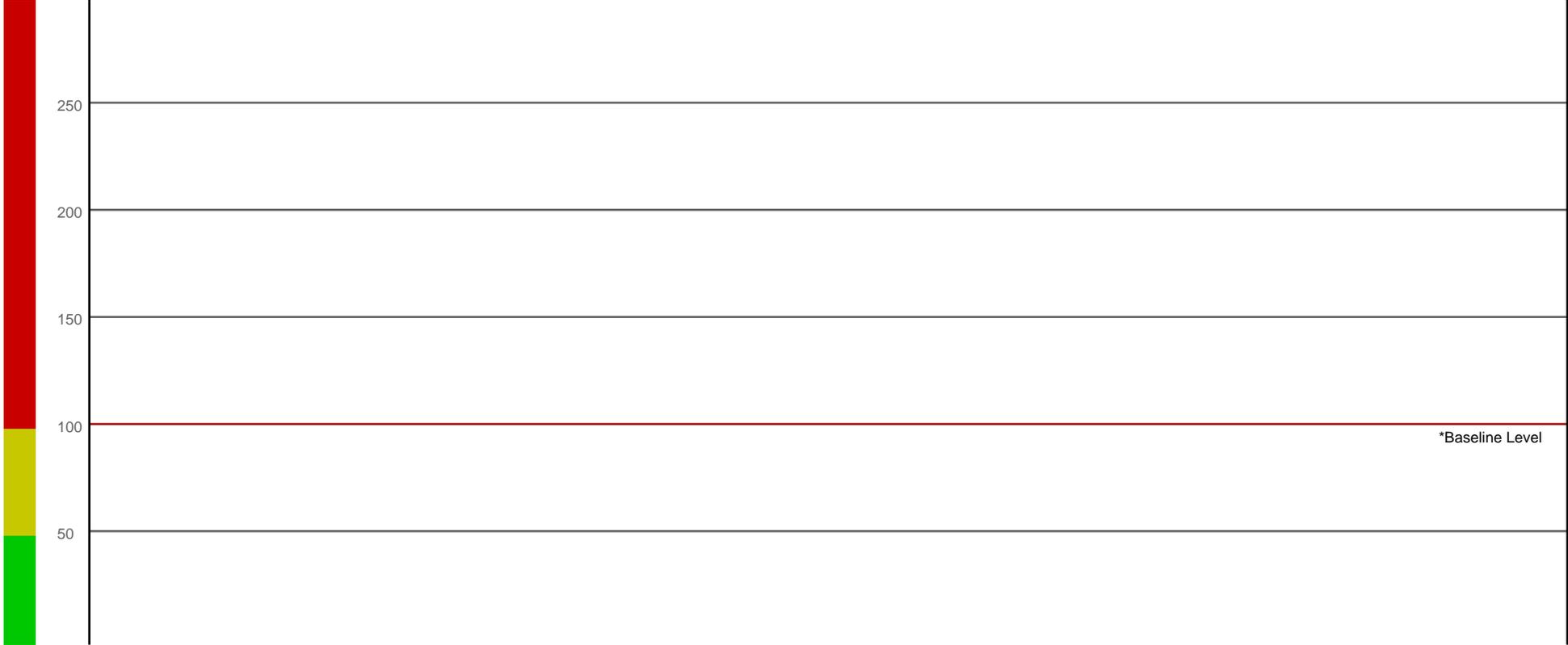
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**Analyst:** Smith, Holly

## Air Cassette Analysis - Spores % of Outside Air

SanAir ID : 9006838-5      Sample # : S-5      ID : SN# 15090346 Sewer Dist. Offices



-  Probable mold amplification
-  Possible mold amplification
-  No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

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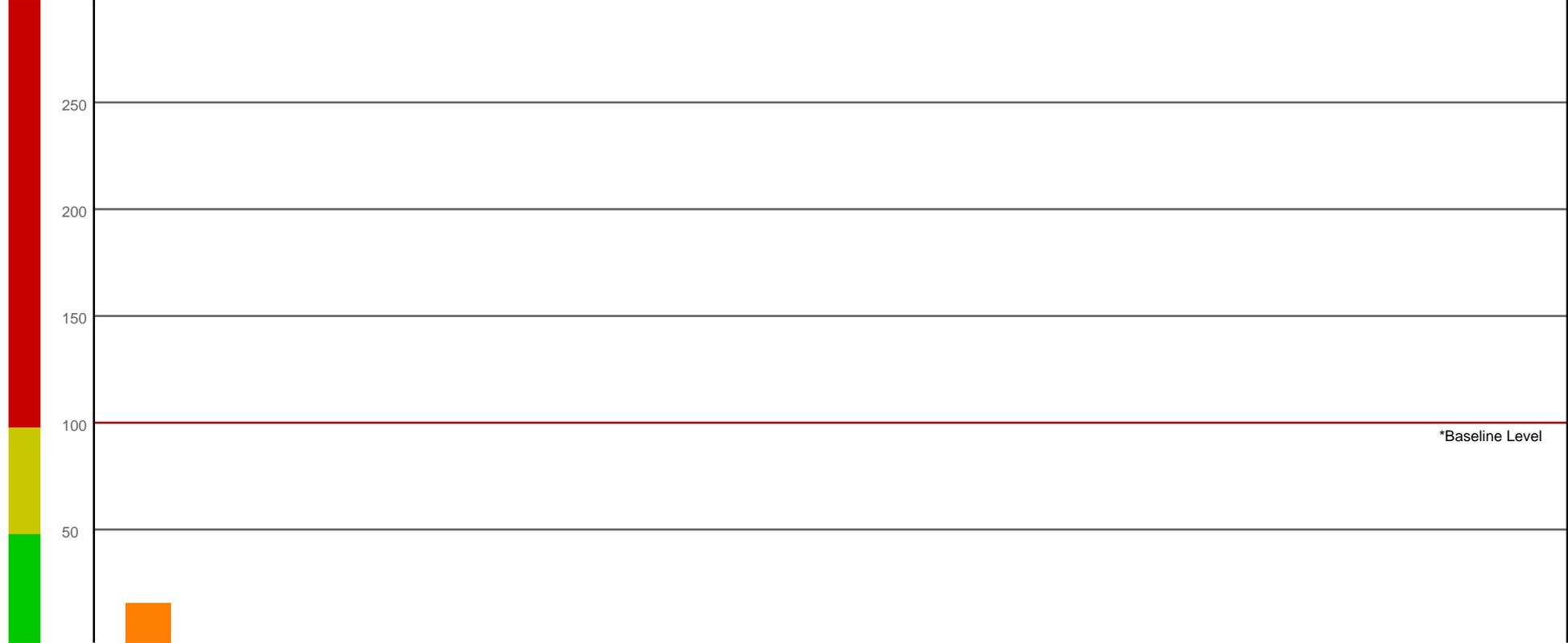
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**Analyst:** Smith, Holly

## Air Cassette Analysis - Spores % of Outside Air

SanAir ID : 9006838-6

Sample # : S-6

ID : SN# 15090340 Planning Offices



18%  
A

- Probable mold amplification
- Possible mold amplification
- No evidence of mold amplification

■ A Aspergillus/Penicillium

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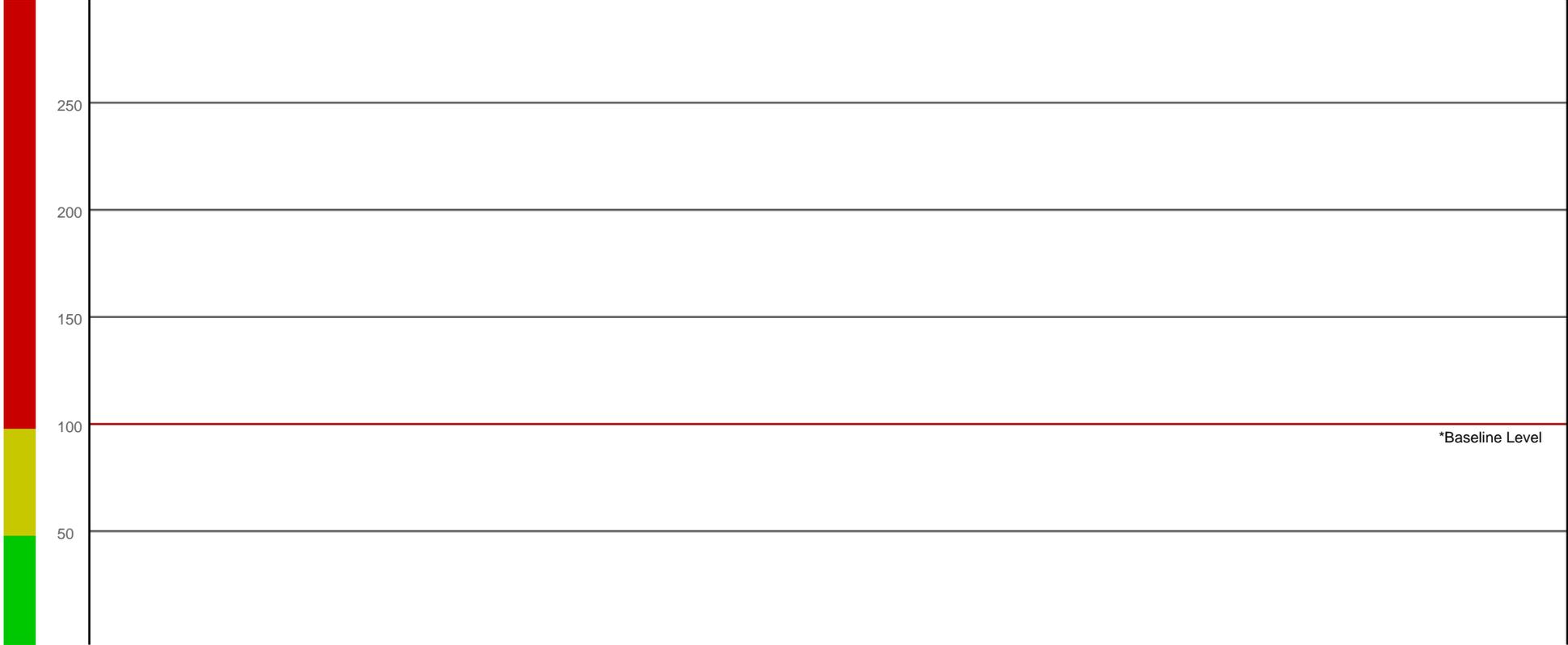
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**Analyst:** Smith, Holly

## Air Cassette Analysis - Spores % of Outside Air

SanAir ID : 9006838-7

Sample # : S-7

ID : SN# 15092291 IT Offices



\*Baseline Level

-  Probable mold amplification
-  Possible mold amplification
-  No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

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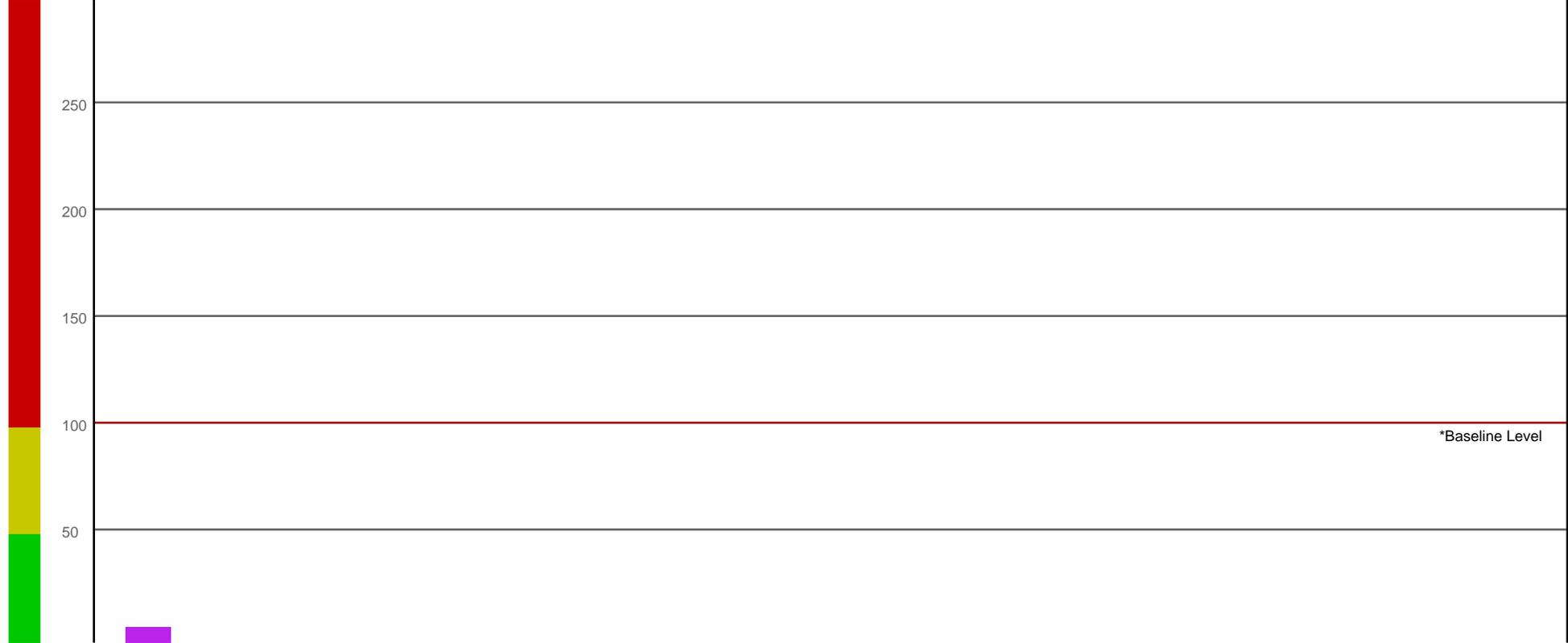
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**Analyst:** Smith, Holly

## Air Cassette Analysis - Spores % of Outside Air

SanAir ID : 9006838-9

Sample # : S-9

ID : SN# 15090355 Stairwell



6%  
A

- Probable mold amplification
- Possible mold amplification
- No evidence of mold amplification

■ A Cladosporium species

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SanAir ID Number

**09006838**

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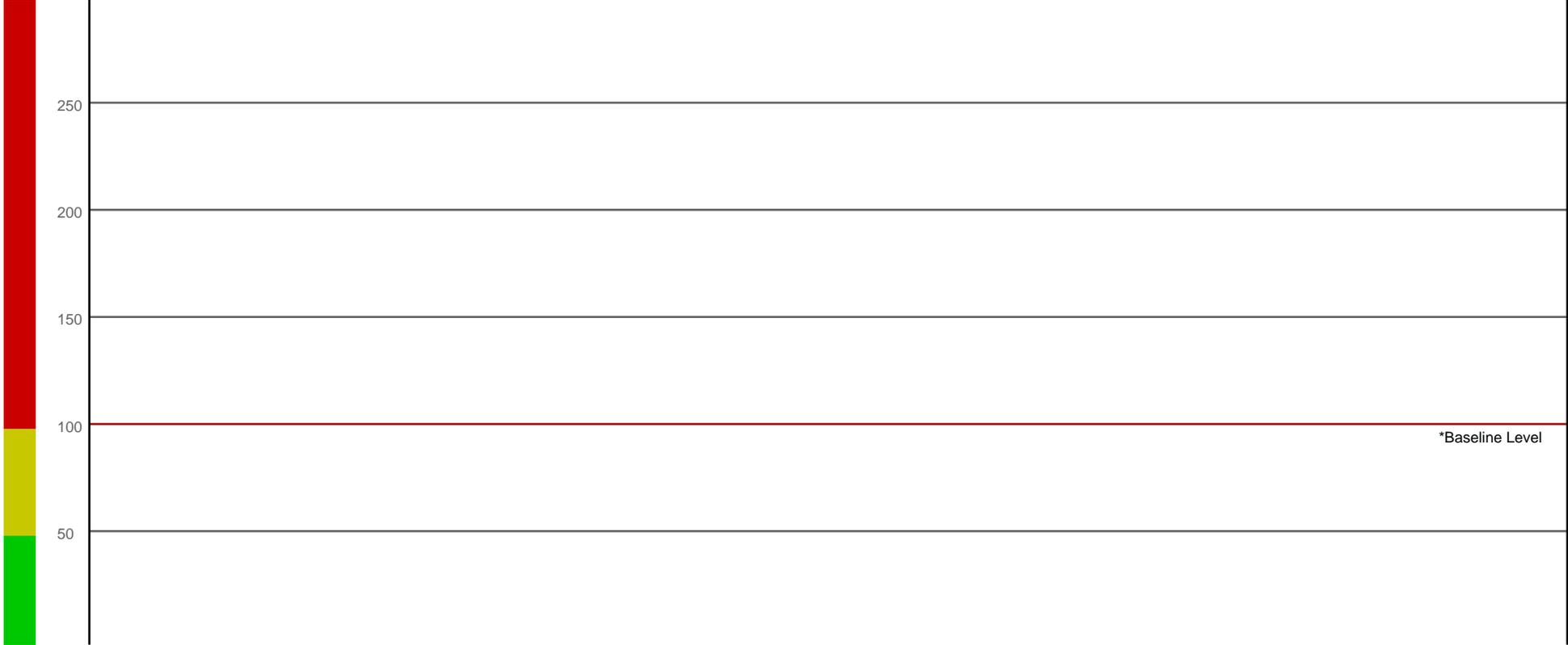
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**Analyst:** Smith, Holly

## Air Cassette Analysis - Spores % of Outside Air

SanAir ID : 9006838-10      Sample # : S-10      ID : SN# 15090309 Pod A "Jail"



-  Probable mold amplification
-  Possible mold amplification
-  No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

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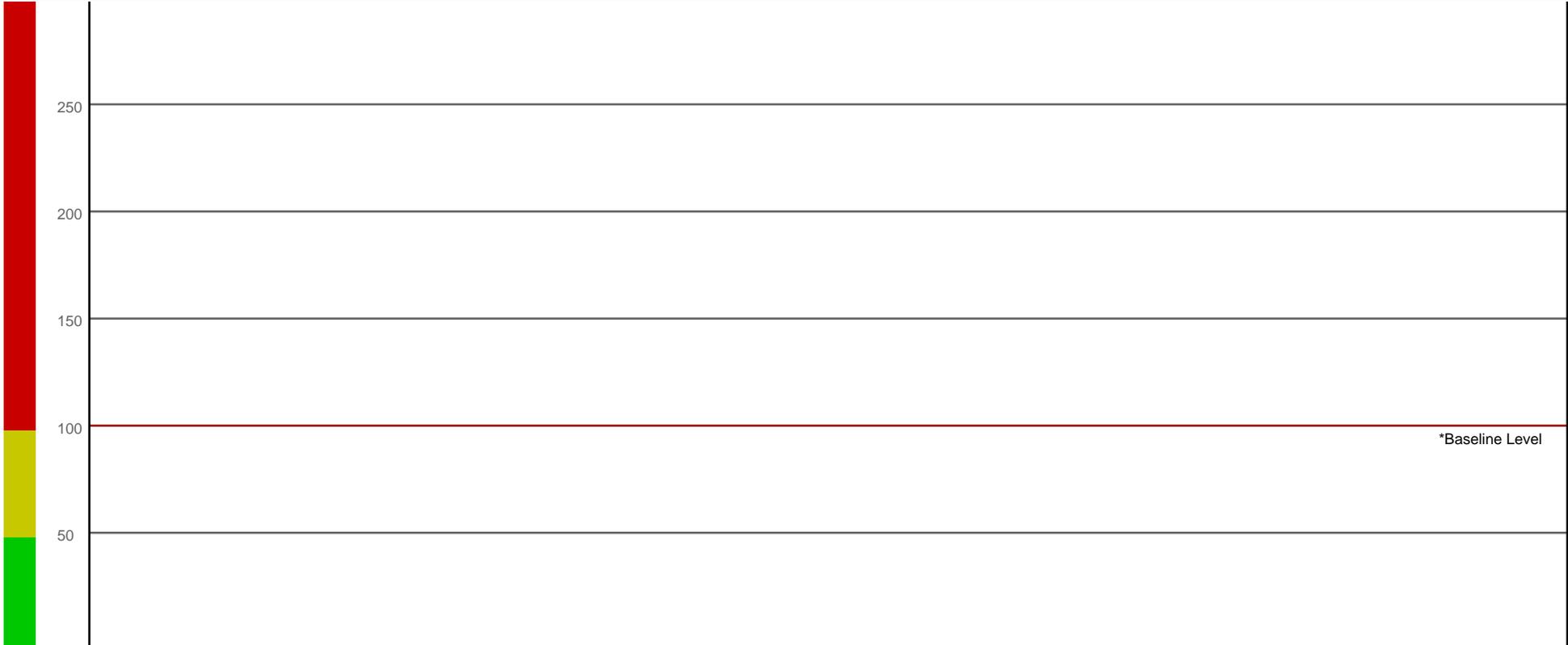
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**Analyst:** Smith, Holly

## Air Cassette Analysis - Spores % of Outside Air

SanAir ID : 9006838-11

Sample # : S-11

ID : SN# 15091318 Pod B "Jail"



- Probable mold amplification
- Possible mold amplification
- No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

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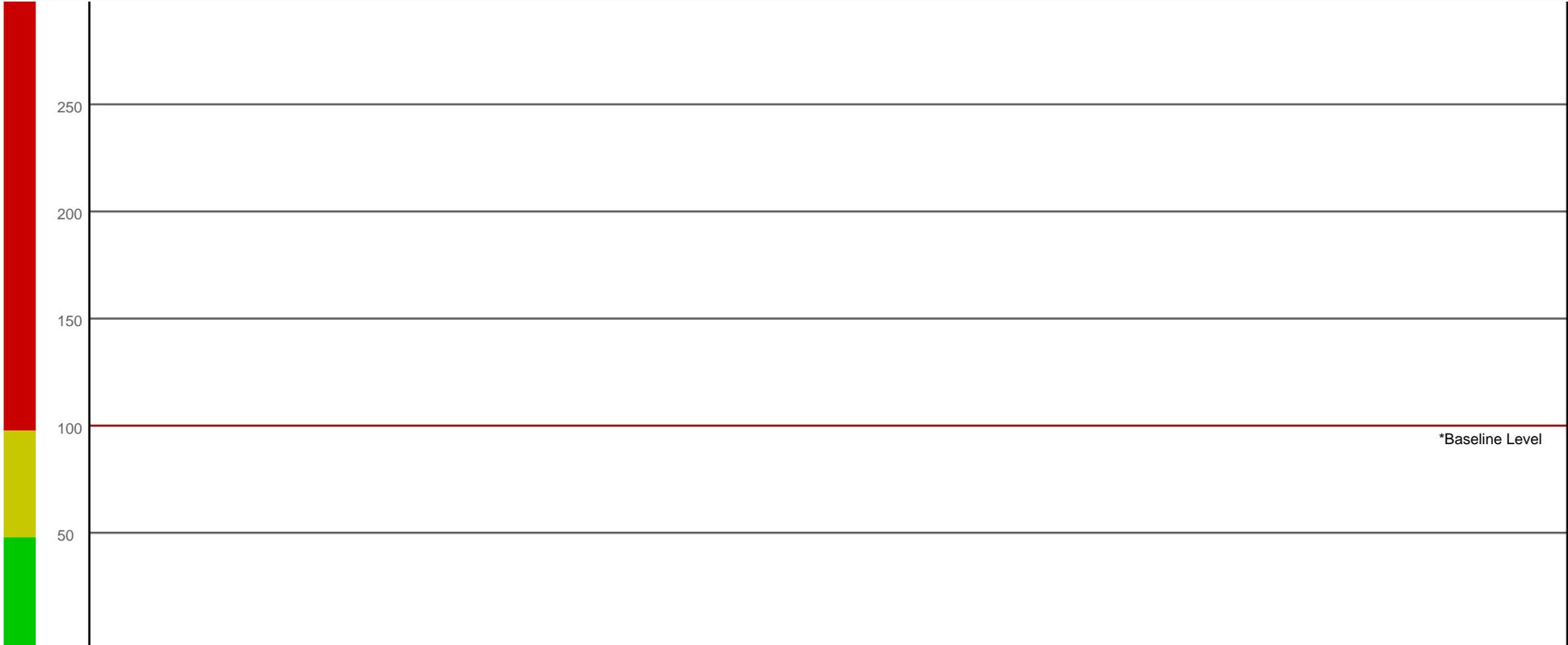
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**Analyst:** Smith, Holly

## Air Cassette Analysis - Spores % of Outside Air

SanAir ID : 9006838-12

Sample # : S-12

ID : SN# 15091340 Pod C



-  Probable mold amplification
-  Possible mold amplification
-  No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

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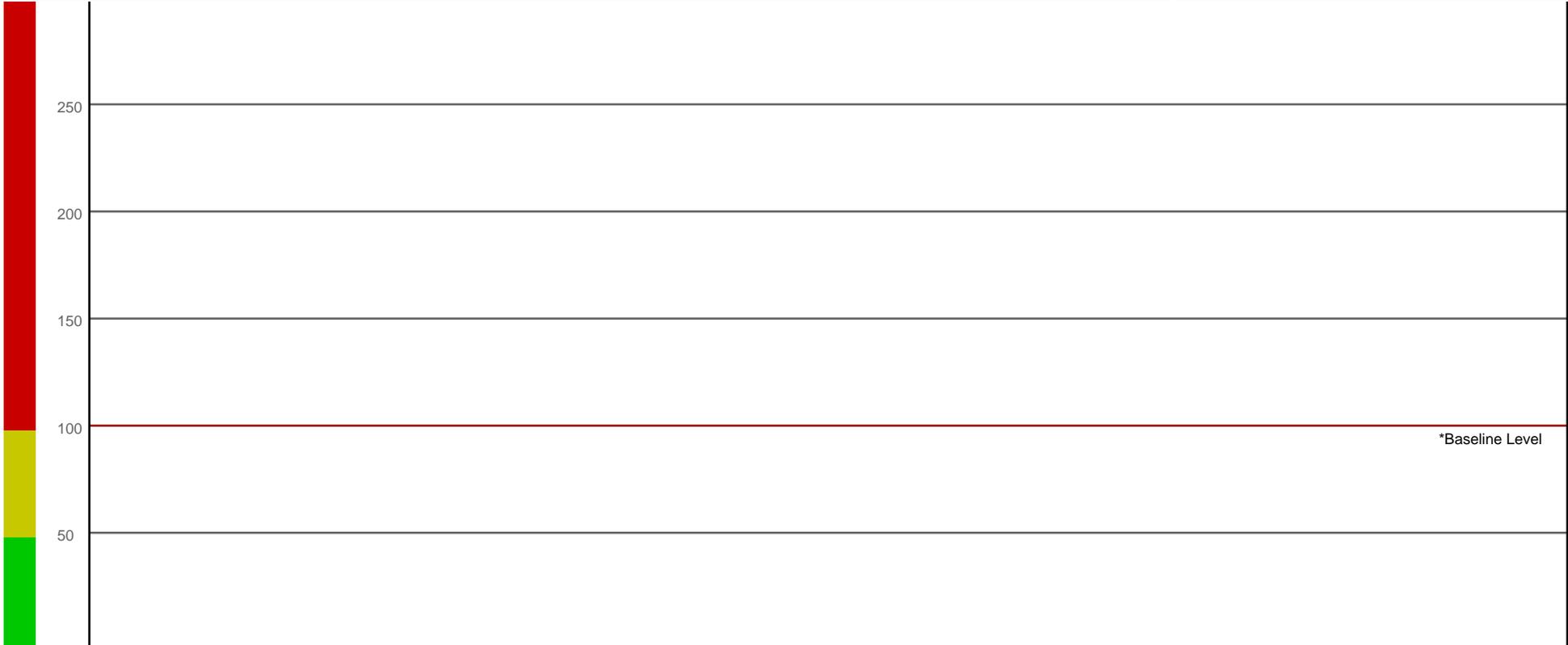
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**Analyst:** Smith, Holly

## Air Cassette Analysis - Spores % of Outside Air

SanAir ID : 9006838-13

Sample # : S-13

ID : SN# 15092297 Court Room Hallway



- Probable mold amplification
- Possible mold amplification
- No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

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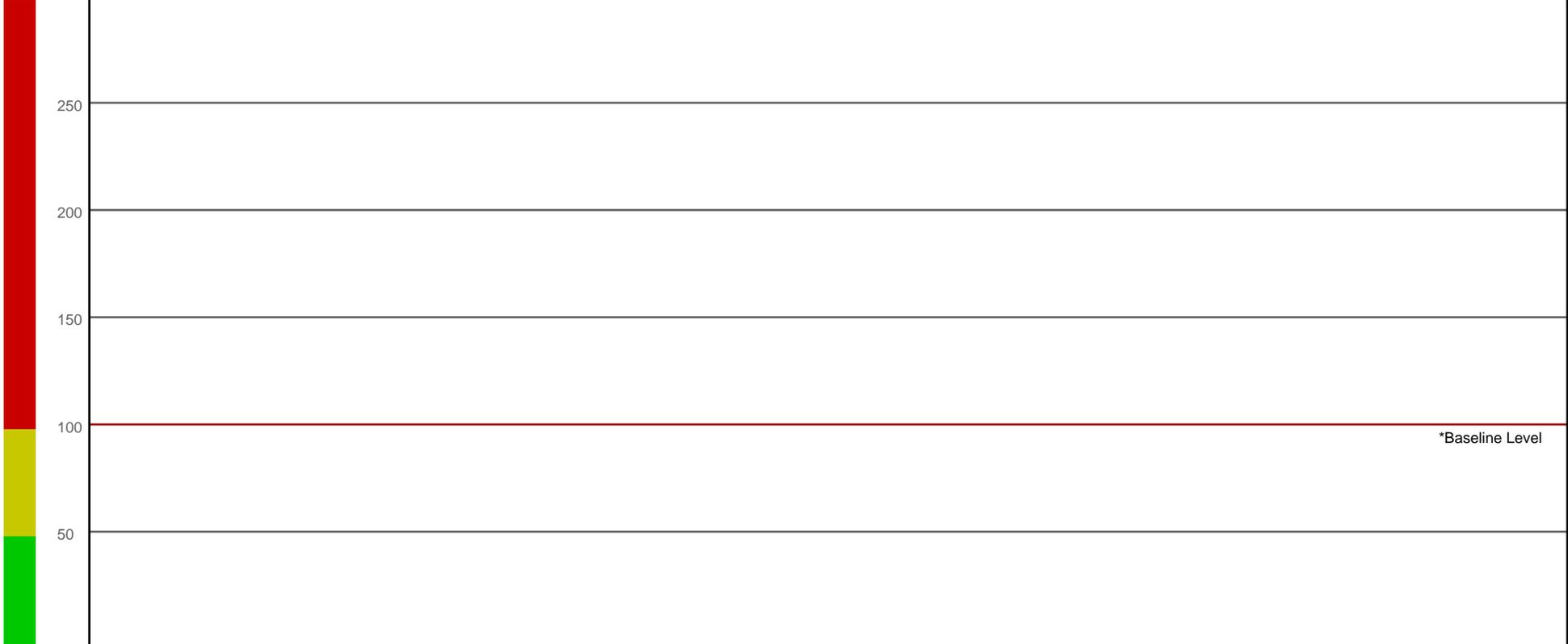
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**Analyst:** Smith, Holly

## Air Cassette Analysis - Spores % of Outside Air

SanAir ID : 9006838-14      Sample # : S-14      ID : SN# 15090333 Recorders Office



-  Probable mold amplification
-  Possible mold amplification
-  No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

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**Analyst:** Smith, Holly

## Direct Identification Analysis

**SanAir ID: 09006838-003 Sample #: S-3 ID: SN# B540544 J.L. Suspect Stain Ceiling Tile In Hallway**

### D3-Direct ID Analysis on Tape Quantitative Direct ID

Fungi	Estimated Amount
Alternaria species	Heavy 180,000 spores / cm sq. 100% of total

**SanAir ID: 09006838-004 Sample #: S-4 ID: SN# B537884 HVAC Coils Lower Offices**

### D3-Direct ID Analysis on Tape Quantitative Direct ID

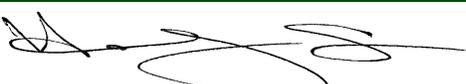
Fungi	Estimated Amount
No Fungi Detected	

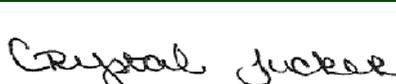
**SanAir ID: 09006838-008 Sample #: S-8 ID: SN# B546936 IT Ofc. Suspect Growth Ceiling**

### D3-Direct ID Analysis on Tape Quantitative Direct ID

Fungi	Estimated Amount
Ascospores	Rare 1 spore / cm sq. 100% of total

## Certification

Signature:   
Date: 8/5/2009

Reviewed:   
Date: 8/6/2009



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## ORGANISM DESCRIPTIONS

*The descriptions of the organisms presented are derived from various reference materials. The laboratory report is based on the data derived from the samples submitted and no interpretation of the data, as to potential, or actual, health effects resulting from exposure to the numbers of organisms found, can be made by laboratory personnel. Any interpretation of the potential health effects of the presence of this organism must be made by qualified professional personnel with first hand knowledge of the sample site, and the problems associated with that site.*

**MYCELIAL FRAGMENTS** - A mycelium (plural = mycelia) is the "body" of a fungus. It is a collective term for hyphae (singular = hypha), which are the tubular units of the mycelium usually composed of chitin. The terms hyphae and mycelial fragments are used interchangeably. [This information was referenced from the mycology text "The Fifth Kingdom"]

**ALTERNARIA SPECIES** - This genus comprises a large number of saprobes and plant pathogens. It is one of the predominate airborne fungal spores indoor and outdoor. Outdoors it may be isolated from samples of soil, seeds, and plants. It is one of the more common fungi found in nature, extremely widespread and ubiquitous. Conidia are easily carried by the wind, with peak concentrations in the summer and early fall. It is commonly found in outdoor samples. It is often found in indoor environments, on drywall, ceiling tiles, in house dust, carpets, textiles, and on horizontal surfaces in building interiors. Often found on window frames. *Health Effects:* In humans, it is recognized to cause type I and III allergic responses. Because of the large size of the spores, it can be deposited in the nose, mouth and upper respiratory tract, causing nasal septum infections. It has been known to cause Baker's asthma, farmer's lung, and hay fever. It has been associated with hypersensitivity pneumoniti, sinusitis, deratomycesis, onychomycosis, subcutaneous phaeohyphomycosis, and invasive infection. Common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Acute symptoms include edema and bronchospasms, chronic cases may develop pulmonary emphysema.

*References:* Flannigan, Brian, Robert A. Samson, and J. David Miller, eds. Microorganisms in Home and Indoor Work Environments: Diversity, Health Impacts, Investigation, and Control. London and New York: Taylor & Francis, 2001.

**ASCOSPORES** - From the fungal Subphylum Ascomycotina. Ascospores are ubiquitous in nature and are commonly found in the outdoor environment. This class contains the "sac fungi" and yeasts. Some ascospores can be identified by spore morphology, however; some care should be exercised with regard to specific identification. They are identified on tape lifts and non-viable analysis by the fact that they have no attachment scars and are sometimes enclosed in sheaths with or without sacs. Ascomycetes may develop both sexual and asexual stages. Rain and high humidity may help asci to release, and disperse ascospores, which is why during these weather conditions there is a great increase in counts. *Health Effects:* This group contains possible allergens.

**ASPERGILLUS/PENICILLIUM** - These spores are easily aerosolized. Only through the visualization of reproductive structures can the genera be distinguished. Also included in this group are the spores of the genera Acremonium, Phialophora, Verticillium, Paecilomyces, etc. Small, round spores of this group lack the necessary distinguishing characteristics when seen on non-viable examination. *Health Effects:* Can cause a variety of symptoms including allergic reactions. Most symptoms occur if the individual is immunocompromised in some way (HIV, cancer, etc). Both Penicillium and Aspergillus spores share similar morphology on non-viable analysis and therefore are lumped together into the same group.

**BASIDIOSPORES** - From the Subphylum Basidiomycotina which contains the mushrooms, shelf fungi, and a variety of other macrofungi. They are saprophytes, ectomycorrhizal fungi or agents of wood rot, which may destroy the structure wood of buildings. It is extremely difficult to identify a specific genera of mushrooms by using standard culture plate techniques. Some basidiomycete spores can be identified by spore morphology; however, some care should be exercised with regard to specific identification. The release of basidiospores is dependant upon moisture, and they are dispersed by wind. *Health Effects:* Many have the potential to produce a variety of toxins. Members of this group may trigger Type I and III fungal hypersensitivity reactions. Rarely reported as opportunistic pathogens.

**BIPOLARIS/DRECHSLERA** - Found on grasses, grains, various plants, and decaying food. May grow in semi-dry environments. Some species are found in indoor environments. Because of the microscopic similarities between the two genera, they are grouped together on both viable and non-viable analysis. *Health Effects:* Can occasionally cause corneal infection of the eye. This group of fungi constitutes the most commonly reported causes of allergic fungal sinusitis. They produce type I fungal hypersensitivity in humans.

*References:* St-Germain, Guy, and Richard Summerbell. Identifying Filamentous Fungi: A Clinical Laboratory Handbook. California: Star Publishing Co., 1996.



**Name:** EGIS, Inc.  
**Address:** 314 South Main  
Bentonville, AR 72712

**Project Number:** 2876.17  
**P.O. Number:**  
**Project Name:** Strafuss

**Collected Date:** 8/3/2009  
**Received Date:** 8/5/2009 10:45:00 AM  
**Report Date:** 8/6/2009 9:22:15 AM

## ORGANISM DESCRIPTIONS

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**BOTRYTIS SPECIES** - Very common. It is parasitic on over 200 plants, vegetables, and soft fruits causing gray mold, but may also be found in soil. Is commonly found in tropical and temperate climates growing on vegetative matter or as a plant parasite. *Health Effects:* Reported to be allergenic, and can induce asthma attacks. Botrytis does have the potential to produce type I and III fungal hypersensitivity reactions.

**CERCOSPORA SPECIES** - Plant pathogen. Cercospora tends to grow on leaves. (Genera of Hyphomycetes, 1980)  
*References:* J.W. Carmichael, W. Bryce Kendrick, I.L. Conners, Lynne Sigler Genera of Hyphomycetes University of Alberta Press, 1980

**CHAETOMIUM SPECIES** - It is an ascomycete. It is found on a variety of substrates containing cellulose including paper and plant compost. It can be found on the damp or water damaged paper in sheetrock after a long term water damage. Several species have been reported to play a major role in decomposition of cellulose made materials. These fungi are able to dissolve the cellulose fibers in cotton and paper, and thus cause these materials to disintegrate. The process is especially rapid under moist conditions. *Health Effects:* Chaetomium can produce type I fungal hypersensitivity and has caused onychomycosis (nail infections).

*References:* Flannigan, Brian, Robert A. Samson, and J. David Miller, eds. Microorganisms in Home and Indoor Work Environments: Diversity, Health Impacts, Investigation, and Control. London and New York: Taylor & Francis, 2001.

**CLADOSPORIUM SPECIES** - The most commonly identified outdoor fungus. The outdoor numbers are reduced in the winter and are often high in the summer. Often found indoors in numbers less than outdoor numbers. It is commonly found on the surface of fiberglass duct liner in the interior of supply ducts. A wide variety of plants are food sources for this fungus. It is found on dead plants, woody plants, food, straw, soil, paint and textiles. Often found in dirty refrigerators and especially in reservoirs where condensation is collected, on moist window frames it can easily be seen covering the whole painted area with a velvety olive green layer. *Health Effects:* It is a common allergen. It can cause mycosis. Common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Acute symptoms include edema and bronchospasms, chronic cases may develop pulmonary emphysema. Illnesses caused by this genus can include phaeohyphomycosis, chromoblastomycosis, hay fever and common allergies.

*References:* Flannigan, Brian, Robert A. Samson, and J. David Miller, eds. Microorganisms in Home and Indoor Work Environments: Diversity, Health Impacts, Investigation, and Control. London and New York: Taylor & Francis, 2001.

**CURVULARIA SPECIES** - Curvularia is found on plant material and is considered a saprobe. It has also been isolated from dust samples and from wallpaper. *Health Effects:* It has been reported to cause type I hypersensitivity and to be a cause of allergic fungal sinusitis. It may cause corneal infections, mycetoma and infections in immune compromised hosts.

*References:* De Hoog, G.S., J. Guarro, J. Gene, and M.J. Figueras. Atlas of Clinical Fungi, 2nd Edition. The Netherlands: CBS, 2000.

**EPICOCCUM SPECIES** - It is found in plants, soil, grains, textiles, and paper products. Frequently isolated from air and occasionally occurs in house dust. Is a saprophyte and considered a weakly parasitic secondary invader of plants, moldy paper and textiles. Epicoccum is usually isolated with either Cladosporium species or Aureobasidium species. *Health Effects:* A common allergen. It also has the potential to produce type I fungal hypersensitivity reactions.

*References:* Flannigan, Brian, Robert A. Samson, and J. David Miller, eds. Microorganisms in Home and Indoor Work Environments: Diversity, Health Impacts, Investigation, and Control. London and New York: Taylor & Francis, 2001.

**FUSARIUM SPECIES** - A common soil fungus and plant pathogen. Fusarium is frequently isolated from plants and grains. It is often found in humidifiers and requires wet conditions to grow. *Health Effects:* A type I allergen. Frequently involved in eye, skin and nail infections. Fusarium is the most common cause of mycotic keratitis and has been isolated from patients with a variety of infections. Some species produce mycotoxin. Food safety issues are related to some species of this genus.

*References:* Flannigan, Brian, Robert A. Samson, and J. David Miller, eds. Microorganisms in Home and Indoor Work Environments: Diversity, Health Impacts, Investigation, and Control. London and New York: Taylor & Francis, 2001.



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**NIGROSPORA SPECIES** - Has been isolated from air and soil samples. Usually found in plant material as a saprobe. *Health Effects:* It has been associated with type I allergic responses. No reported cases of infection.

*References:* St-Germain, Guy and Richard Summerbell. Identifying Filamentous Fungi: A Clinical Laboratory Handbook. California: Star Publishing Company., 1996.

**PERICONIA SPECIES** - Members of this genus are typically parasitic plant pathogens. They are typically associated with plants and the outdoors. *Health Effects:* Can produce type I fungal hypersensitivity reactions. There are occasions where Periconia have been implicated in mycotic keratitis, but this is a rare event.

*References:* Ellis, Martin B., Ellis, Pamela, Microfungi on Land Plants: An Identification Handbook. England, The Richmond Publishing Co. Ltd., 1997.

**PITHOMYCES SPECIES** - Grows on dead grass in pastures and decaying plant material. *Health Effects:* Causes facial eczema in ruminants.

*References:* St-Germain, Guy, and Richard Summerbell. Identifying Filamentous Fungi: A Clinical Laboratory Handbook. California: Star Publishing Co., 1996.

**POLYTHRINCIUM SPECIES** - This fungus is often associated with leaves and other plant material. There are no reports of any clinical significance or allergenic properties.

*References:* Ellis, Martin B., Ellis, Pamela, Microfungi on Land Plants: An Identification Handbook. England, The Richmond Publishing Co. Ltd., 1997.

**PYRICULARIA SPECIES** - This fungus tends to grow on grasses.

*References:* J.W. Carmichael, W. Bryce Kendrick, I.L. Connors, Lynne Sigler Genera of Hyphomycetes University of Alberta Press, 1980

**RUSTS** - From the group Uredinales, called Rusts due to the color of the spores, which are known for causing disease in plants.

**SMUTS/MYXOMYCETES** - Smuts and Myxomycetes are parasitic plant pathogens. They are typically grouped together due to their association with plants, the outdoors and because they share similar microscopic morphology. *Health Effects:* Can produce type I fungal hypersensitivity reactions.

*References:* Martin, G.W., C.J. Alexopoulos, and M.L. Farr. The Genera of Myxomycetes. Iowa City, Iowa: University of Iowa Press, 1983.

**SPORIDESMIUM SPECIES** - Sporidesmium species can be found on dead and living plant material including the woody parts of a variety of trees around the world. May be isolated from bulk samples of wood building materials.

**TORULA SPECIES** - Torula is a saprophyte and therefore often found on plant material. It may be found on wood-containing products/materials. *Health Effects:* Reported to produce type I fungal hypersensitivity.

*References:* Ellis, Martin B., Ellis, Pamela, Microfungi on Land Plants: An Identification Handbook. England, The Richmond Publishing Co. Ltd., 1997.

**ULOCLADIUM SPECIES** - Isolated from soil, dead plants and cellulose materials. Found on textiles. It can be found on many types of materials, but mostly found on decaying materials. Has a greater water activity need for growth and is therefore considered a water indicator organism. *Health Effects:* Reported to be a major allergen. Rarely causes subcutaneous infections in humans. It has a high water requirement.

*References:* De Hoog, G.S., J. Guarro, J. Gene, and M.J. Figueras. Atlas of Clinical Fungi, 2nd Edition. The Netherlands: CBS, 2000.

**UNKNOWN SPORES** - This category is used for spore types without any differentiating characteristics for a more definitive



# SanAir Technologies Laboratory, Inc.

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804.897.1177 Toll Free: 888.895.1177 Fax: 804.897.0070  
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SanAir ID Number

09006838

FINAL REPORT

**Name:** EGIS, Inc.  
**Address:** 314 South Main  
Bentonville, AR 72712

**Project Number:** 2876.17  
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classification.

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 804-897-1177 / 888-895-1177 / Fax 804-897-0070  
 www.sanair.com

## Microbiology Chain of Custody

SanAir ID Number

09006838

Company: EGIS, Inc.	Project Number: 2876.17	Phone #: 479-271-9252
Address: 314 South Main	Project Name: Strafuss	Phone #:
City, State, Zip: Bentonville, AR 72712	Date Collected: 8/3/2009	Fax #: 479-271-8627
Samples Collected By: <i>Frank Barnes / Ricky Davis</i>	P.O. Number:	Email: sdaniel@egis-env.com

*bsisemore@egis-env.com*

Sample Types		Analysis Types	Turn Around Time
AC	Air Cassette	A1 - Identification and Enumeration of Fungal spores, plus total dander, fiber, and pollen count	3/6/12/24 Hour
		A2 - Identification and Enumeration of Fungal spores only	3/6/12/24 Hour
T B	Tape Bulk	D1 - Direct Identification of Fungi	3/6/12/24 Hour
		D2 - Direct Identification of Mites, Insects, Pollen, etc.	3/6/12/24 Hour
		D3 - Direct Identification enumerated per cm <sup>2</sup> Per Steve	3/6/12/24 Hour
AP B S	Air Plate Bulk Swab	C1 - Culture Identification and Enumeration of Fungi only	5-10 Days
		C2 - Culture Identification and Enumeration of Bacteria only	2-4 Days
		C3 - Culture Identification and Enumeration of Fungi and Bacteria	5-10 Days
		C4 - Culture Identification and Enumeration of Thermophilic Bacteria with C2 or C3 analysis	2-4 or 5-10 Days
		O - Other - Specify:	

Sample #	Sample Identification	Sample Type	Analysis Type(s)	Turn Around Time	Total Volume (L) or Area (in <sup>2</sup> )	Time Start - Stop	
S-1	Outside Air SN # 15090316	AC	A2	24 hrs	15 L/min	10	Min
S-2	SN # 15090318 Garys office air	AC	A2	24 hrs	15 L/min	10	min
S-3	SN # 8540544 T.L. suspect stain ceiling tile in hallway by bathroom	T	D3	24 hrs	4cm <sup>2</sup>	N	A
S-4	SN # 8537884 HVAC coils lower offices	T	D3	24 hrs	4cm <sup>2</sup>	N	A
S-5	SN # 15090346 Saver Dist. Offices	AC	A2	24 hrs	15 L/min	10	min
S-6	SN # 15090340 Planning offices	AC	A2	24 hrs	15 L/min	10	min
S-7	SN # 15092291 IT offices	AC	A2	24 hrs	15 L/min	10	min
S-8	SN # 8546936 IT etc. suspect growth ceiling	T	D3	24 hrs	4cm <sup>2</sup>	N	A
S-9	SN # 15090355 stair well	AC	A2	24 hrs	15 L/min	10	min
S-10	SN # 15090309 POD A "Jail"	AC	A2	24 hrs	15 L/min	10	min
S-11	SN # 15091318 POD B "Jail"	AC	A2	24 hrs	15 L/min	10	min

<b>Special Instructions</b>	Enumeration is needed on all direct identification. <i>email results to bsisemore@egis-env.com</i>
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Relinquished by	Date	Time	Received by	Date	Time
<i>Frank Barnes</i>	8-4-09	5:00 pm	<i>KS</i>	AUG 05 2009	10:45 A

Unless scheduled, the turn around time for all samples received after 5 pm Friday will begin at 8 am Monday morning.  
 Weekend or Holiday work must be scheduled ahead of time and is charged for rush turn around time.  
 Work with standard turn around time sent Priority Overnight and Billed To Recipient will be charged a \$10 shipping fee.

AC\_A2\_3/6/12/24hrs\_15L/min\_10 min  
 AC\_A2\_3/6/12/24hrs\_15L/min\_1 min (wall)  
 T\_D3\_3/6/12/24hrs\_4cm<sup>2</sup>\_NA

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SanAir ID Number  
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Company: EGIS, Inc.	Project Number: 2876.17	Phone #: 479-271-9252
Address: 314 South Main	Project Name: Straffuss	Phone #:
City, State, Zip: Bentonville, AR 72712	Date Collected: 8-3-2009	Fax #: 479-271-8627
Samples Collected By: Manuel Barnes/Ricketts	P.O. Number:	Email: sdaniel@egis-env.com

bisemore@egis-env.com

Sample Types		Analysis Types	Turn Around Time
AC	Air Cassette	A1 - Identification and Enumeration of Fungal spores, plus total dander, fiber, and pollen count	3/6/12/24 Hour
		A2 - Identification and Enumeration of Fungal spores only	3/6/12/24 Hour
T B	Tape Bulk	D1 - Direct Identification of Fungi	3/6/12/24 Hour
		D2 - Direct Identification of Mites, Insects, Pollen, etc.	3/6/12/24 Hour
		D3 - Direct Identification enumerated per cm <sup>2</sup> Per Steve	3/6/12/24 Hour
AP B S	Air Plate Bulk Swab	C1 - Culture Identification and Enumeration of Fungi only	5-10 Days
		C2 - Culture Identification and Enumeration of Bacteria only	2-4 Days
		C3 - Culture Identification and Enumeration of Fungi and Bacteria	5-10 Days
		C4 - Culture Identification and Enumeration of Thermophilic Bacteria with C2 or C3 analysis	2-4 or 5-10 Days
		O - Other - Specify:	

Sample #	Sample Identification	Sample Type	Analysis Type(s)	Turn Around Time	Total Volume (L) or Area (in <sup>2</sup> )	Time Start - Stop
	Outside Air SN #	AC	A2	24 hrs	15 L/min	Min
S-12	SN# 15091340 POD C	AC	A2	24 hrs	15 L/min	10 min
S-13	SN# 15092297 Court Room hallway	AC	A2	24 hrs	15 L/min	10 min
S-14	SN# 15090333 Records office	AC	A2	24 hrs	15 L/min	10 min
	SN #					
	SN #					
	SN #					
	SN #					
	SN #					
	SN #					
	SN #					

**Special Instructions** Enumeration is needed on all direct identification.  
 Email results to bisemore@egis-env.com

Relinquished by	Date	Time	Received by	Date	Time
<i>Manuel Barnes</i>	8-4-09	5:00 pm	<i>[Signature]</i>	AUG 05 2009	10:15 A

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 Work with standard turn around time sent Priority Overnight and Billed To Recipient will be charged a \$10 shipping fee.

AC\_A2\_3/6/12/24hrs\_15L/min\_10 min  
 AC\_A2\_3/6/12/24hrs\_15L/min\_1 min (wall)  
 T\_D3\_3/6/12/24hrs\_4cm<sup>2</sup>\_NA

## Additional Information

### Air Cassette Analyses

Air cassette reports indicate the genus and concentration of viable (living) and non-viable mold spores detected on the slide (A2 Analysis). Whether or not these spores are viable cannot be determined using this type of analysis. However, keep in mind that spores can remain allergenic even after cellular death. Other possible allergens include dander, pollen and fibers which are included in air cassette reports for the A1 Analysis. A1 and A2 analyses are performed on several types of air cassettes. Light microscopy at a 400 to 1000x magnification is used for air cassette sample analysis. SanAir always analyzes 100% of the impacted slide.

### Explanation of Background Densities

The background density of an air cassette aids in the overall interpretation of results as it indicates the level of background debris present (e.g. dander, pollen, fibers, insect parts, soot, fly ash, etc.). Excessive background debris may mask the presence of fungal spores thereby reducing the accuracy of the count. It may also serve as an alert that the volume of air pulled was too high or too low. The following table explains background densities.

<b>Air Cassette Density</b>	<b>Amount of Particulate on Slide</b>	<b>Explanation</b>
1	Insignificant	Should not skew any counts
1+	Low	Should not skew any counts
2	Low to Moderate	Should not skew any counts
2+	Moderate to High	May cause occlusion of small spores
3	High	May cause occlusion of small to medium spores
3+	Very High	Will cause occlusion of spores
4	Overloaded	Level of particulate too high to perform analysis

### A Note About the Fungal Spores

In some instances certain groups of fungi cannot be identified due to a lack of distinguishing characteristics. These fungi will be categorized as “unknown spores” on the final report.

The genera *Aspergillus* and *Penicillium* are typically composed of small, round spores that are difficult to distinguish from each other; therefore, they are grouped into the category *Aspergillus / Penicillium*. Other fungi that produce spores of similar characteristics may also be placed into this category, including *Paecilomyces*, *Gliocladium*, and *Trichoderma*, among others.

*Stachybotrys* and *Memnoniella* spores are coated with a sticky “slime” layer that may inhibit aerosolization.

Any genus of fungi detected on an air cassette with a high raw count (i.e. exceeding 500 spores) may be estimated. Any estimate higher than 12,000 spores will be reported as >12,000.

### Understanding the Air Cassette Report

Each sample has 3 columns of information provided. The left is the raw count which is the number of spores for that fungal type detected on the trace. The middle column is the count per cubic meter (Count/m<sup>3</sup>) which is the raw count converted based on the total volume pulled for that sample. It represents the number of spores that should be expected in a cubic meter of air from the location in question *if* the spores were distributed evenly throughout the air. This column is helpful for interpreting results when the samples were pulled at different total volumes. In other words, the raw count of a cassette pulled at 75 liters should not be compared to the raw count of a cassette pulled at 150 liters because there may be higher counts associated with the higher volume. By comparing the “Count/m<sup>3</sup>” columns the difference in volumes are accounted for.

The limit of detection is the lowest spore count detectable with reasonable certainty, and it is calculated this way using a raw count of one. Keep in mind there are 1,000 liters in a cubic meter.

$$1 \times (1,000 / \text{Total Volume in Liters})$$

Revision Date: 4/1/2009

How to calculate the count per cubic meter:

$$\text{Raw Count} \times (1,000 / \text{Total Volume in Liters})$$

The last column on the right shows the percentage for which each spore type comprised the total spore count.

### **Understanding the Air Cassette Graph**

The graph is a visual representation of the baseline sample (usually the outdoor air sample) compared individually against each indoor sample. Each spore type found on the indoor sample is compared to what was found outdoors per cubic meter.

The graph shows the percentile representation of each indoor spore count derived by dividing the indoor Count/m<sup>3</sup> by the outdoor Count/m<sup>3</sup>. If the percentage is below 50% of the outside count, then the bar is below 50 on the chart, which corresponds to "No evidence of mold amplification." If the percentage is between 50 and 100%, then the bar on the chart will stop between 50 and 100, which corresponds to "Possible mold amplification." If the percentage is greater than 100%, then the bar will be above 100 on the chart, which corresponds to "Probable mold amplification."

Each organism is given a threshold level for the Count/m<sup>3</sup>. If this threshold level is not met in an inside sample, then the organism will not be graphed on the chart. This is used to prevent the graph from showing every spore type that is commonly found outside and doesn't typically indicate a possible moisture problem inside. For example, most common outdoor spores (e.g. ascospores, basidiospores, and *Cladosporium*) have a threshold level of 100. Therefore, in order to show up on the chart, the inside Count/m<sup>3</sup> must be above 100. On the other hand, fungi that may indicate water damage (e.g. *Stachybotrys*, *Ulocladium*, *Chaetomium*, *Memnoniella*, etc.) are given lower threshold levels. These fungi have a higher water activity value and therefore require more moisture to grow. *Stachybotrys* and *Chaetomium* have threshold values of 14 and 30, respectively, as even a low count of those types of spores may indicate an issue with excess moisture.

Keep in mind that this graph is to be used only as a tool in the inspection of a building. Visual examination and knowledge of water damage, past remediation, and weather conditions, among other elements, is essential in the decision regarding the indoor air quality of a building.

### **Assistance with Remediation Projects**

\*\*more information pertaining to interpretation of results is available on our website [www.sanair.com](http://www.sanair.com)\*\*

For assistance in a remediation project you may consult the Institute of Inspection, Cleaning and Restoration Certification's (IICRC) S500 and S520 protocols. The S500 is a reference guide for water-damage restoration and the S520 pertains specifically to mold remediation. Other standards and guidelines regarding Indoor Air Quality that may assist in remediation projects:

- AIHA (Recognition, Evaluation, and Control of Indoor Mold)
- AIHA (The Facts About Mold)
- NADCA (ACR 2006)
- IESO (Standards of Practice for the Assessment of Indoor Air Quality)
- EPA (Mold Remediation in Schools and Commercial Buildings)
- New York City Department of Health and Mental Hygiene (Guidelines on Assessment and Remediation of Fungi in Indoor Environments)

### **Disclaimer**

*This report is the sole property of the client named on the SanAir Technologies Laboratory chain-of-custody. Neither results nor reports will be discussed with or released to any third party without our client's written permission. The information provided in this report applies only to the samples submitted and is relevant only for the date, time and location of sampling. **SanAir will not provide any opinion on the safety of a building as visual inspection and knowledge of water damage, past remediation and weather conditions during sampling, among other elements, is essential in this decision.** SanAir is accredited by AIHA in the EMLAP program for Direct Examination of air samples.*

## Additional Information

### Direct Identification Analyses

Direct identification analyses can be performed on tape, bulk, dust and swab samples. Direct identification reports indicate the evidence of possible active growth for each genus of fungi present. Whether or not these spores are viable or nonviable cannot be determined using this type of analysis; the sample would have to be cultured in order to determine viability. Keep in mind that this report is valid only for the exact spot in which the sample was taken. Potential mold contamination of other areas can only be extrapolated from the data reported. Light microscopy at a 400 to 1000x magnification is used for direct identification analysis.

For meaningful results, the person sampling the area is encouraged to include a blank tape sample in order to check for contamination during sampling or shipment. Be sure to check the expiration date of any tape. It is recommended not to use expired tapes as the gel on the slide deteriorates thereby losing the tackiness necessary to retain fungi.

The genera *Aspergillus* and *Penicillium* are typically composed of small, round spores that are difficult to distinguish from each other without the presence of intact conidiophores (structures from which spores are formed and released). In this case, they are grouped into the category *Aspergillus / Penicillium*. Other fungi that produce spores of similar characteristics to *Aspergillus* and *Penicillium* may also be placed into this combined category in the absence of intact conidiophores (e.g. *Paecilomyces*, *Gliocladium*, *Trichoderma*, etc.).

### D3 Analysis: Fungi with Description of Possible Growth, Plus Count Estimates Per Square Inch

This analysis includes spore count estimates for each fungus identified.

<b>Estimated Amount</b>	<b>Indication of Growth</b>	<b>Evidence of Mycelial Fragments / Conidiophores</b>
<b>Rare</b>	Not Likely	None
<b>Light</b>	Possible	Some, 10 to 25% of Tape Covered
<b>Moderate</b>	Probable	Abundant, 25 to 50% of Tape Covered
<b>Heavy</b>	Significant	Throughout, 50 to 100% of Tape Covered

All counts are estimates based on the area of 1 square centimeter. Any estimate higher than 500,000 spores will be reported as >500,000 spores.

### Disclaimer

*This report is the sole property of the client named on the SanAir Technologies Laboratory chain-of-custody. Neither results nor reports will be discussed with or released to any third party without our client's written permission. The information provided in this report applies only to the samples submitted and is relevant only for the date, time and exact location of sampling. **SanAir will not provide any opinion on the safety of a building as visual inspection and knowledge of water damage and past remediation, among other elements, is essential in this decision.** SanAir is accredited by AIHA in the EMLAP program for Direct Examination of bulk and surface samples.*



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### D3 Analysis Information

Results for direct identification analyses (D3) are quantitative. Estimates of mycelial growth as rare, light, moderate, or heavy are provided in addition to the counts, to provide a better overall picture of the sampled area. These estimates apply only to Quantitative Direct Analysis (D3).

Rare.....No signs of active growth. No mycelial fragments seen.

Light.....Possible active growth. Some mycelial fragments seen.

Moderate.....Probable active growth. Mycelial fragments throughout.

Heavy.....Significant active growth. Mycelial fragments throughout.