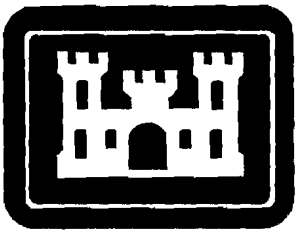
May 3, 2002

23970-011-0001

# Indoor Air Quality (IAQ) Supplemental Investigation Report

For

## Brittin Elementary School
## Building 7392
## Fort Stewart, Georgia



*Prepared for*

## U.S. ARMY CORPS OF ENGINEERS
## *Ft. Worth Distict*

*Under Contract*

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*Prepared by*

Baker

**Baker and Associates**
*Coraopolis, Pennsylvania*

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## EXECUTIVE SUMMARY

Baker and Associates, Inc. (Baker) was contracted to perform a follow-up indoor air quality (IAQ) investigation and testing in response to further complaints at Brittin Elementary School (BES), located at Fort Stewart, Georgia. Complaints of odors, rashes, respiratory irritation, skin and eye irritation, and headache were received from both students and staff since mid September, 2001. In December, 2001, a team from Baker inspected the school, interviewed affected staff, and collected various air samples. The findings and conclusions of that investigation are contained in Baker's January, 2002 Indoor Air Quality Investigation Report. The recommendations at that time were to proceed with installation of the new HVAC system, and in the interim, implement temporary measures to provide fresh air to the classrooms, including force-ventilating with box fans through the fire escapes.

After the report, the school started to implement the interim measures to dilute indoor air contaminants by opening the fire windows and force-ventilating the rooms with box fans. There were a total of 5 IAQ complaints in November, 19 in December, one in January, 14 in February, and 172 in March. As a result of the dramatic increase in IAQ-related complaints from both staff and students, Baker was asked to perform this follow-up investigation and to conduct more extensive testing and a more invasive building inspection. This follow-up investigation was conducted from 1 April to 3 April, 2002, during the Spring break when students and teachers would not be present.

Baker collected air and bulk samples for various analyses. The air samples collected measured carbon dioxide, carbon monoxide, temperature, relative humidity, airborne fibers, formaldehyde, total fungal spores, viable fungal spores, viable airborne bacteria. The bulk samples measured fungal loading of building materials and occupants' belongings. The sampling was performed during spring break, when no students or teachers were present.

The temperature, relative humidity, carbon monoxide and carbon dioxide levels were within the acceptable range for human comfort. Airborne fibers were not detectable.

Low levels of formaldehyde were identified just above the laboratory detection limit in four rooms. Formaldehyde is a primary irritant as well as a sensitizing agent which can elicit an allergic reaction

at low level exposures. Some potential sources of formaldehyde may be present in the classrooms. Since the building is 20 years old, it is expected that the majority of the off-gassing of formaldehyde from these sources will have already occurred. However the potential presence of these sources combined with a 100% recycling HVAC system and the force protection requirements to keep the windows closed after September 11, 2001 may have allowed formaldehyde to accumulate in the classrooms to a level that could irritate an already sensitized person.

There does not appear to be a bacterial or dust mite related indoor air quality issue in any area of Brittin Elementary School that was sampled.

The spore traps taken in Wings A, B, and C do not show elevated levels of fungal spores present in the air. The spores identified reflect those of the outdoor environment and are of agricultural origin.

The viable (able to grow in a laboratory culture) airborne fungal results show typical indoor levels and types of fungi in Wings B and C. The fungi found inside reflect the fungi found in the outdoor control. There is no evidence of airborne fungal amplification in these wings.

The viable airborne fungal results for Wing A indicate repeated low levels of *Stachybotrys, Chaetomium,* and mixed *Aspergillus species.* The older students in this wing rotate in and out of the trailers. There does not appear to be a reservoir in any of these classrooms. It is more than likely that these indicator organisms have been carried into the classrooms on the students' clothing, school-related items, and personal items.

All six rooms in the trailers have visible reservoirs of mold. The viable airborne cultures, the spore traps, the bulk materials and wipes all show elevated levels of potential mycotoxigenic (capable of producing mycotoxins) and allergenic molds.

The carpet dust samples indicate a range of fungal concentrations. The numbers range from 30,000 cfu/g to 3.1 x $10^6$ cfu/g in all three wings of the school and the trailers. There is no concentration of "indicator" mycotoxigenic fungi present, but *Cladosporium,* which can be allergenic, is present in most of the samples at significant concentrations. Therefore, this is a potential exposure issue for allergenic and asthmatic occupants. The presence of high carpet dust fungal concentrations,

combined with a 100% recirculating HVAC system, is likely to have been a significant contributing factor to the symptoms reported by the school occupants. Please refer to further details in this report and to the University of Minnesota document in Appendix H of Attachment A for guidelines for dust levels.

Wipe samples taken from the contents of Room C3, Room A10, Room A11, Room A13, and Room T6 indicated levels of typical indoor and outdoor spores that were deposited on the materials. There was no evidence of amplification on these materials, and moving the contents off-site would not be a problem.

## RECOMMENDATIONS

The trailers should not be used for classrooms or any other function. Non-porous materials may be removed after being cleaning by trained individuals with appropriate personal protection (N, R or P-100 respirator, gloves, eye protection and disposable protective clothing). Porous material should be disposed of. If porous material must be recovered, HEPA vacuum the material, wipe down, dry and HEPA vacuum one more time. Resample using the same sampling protocol. The presence of any amount of the indicator organisms, i.e. *Aspergillus*, *Penicillium*, *Stachybotrys*, *Chaetomium*, *Tricoderma*, or *Fusarium* would prohibit the further use of the material until additional cleaning is performed.

The contents of the main building classrooms that are relocating can be cleaned by HEPA vacuuming porous materials and wiping down non-porous materials with a mild detergent. Resampling would not be necessary for these items.

The carpet is a reservoir for multiple types of allergens. The levels are due to the age of the carpet, the type of activity, the allergen loading caused by the lack of fresh air, recirculation of return air and the geographic area that has high fungal concentrations most of the year. All these contribute to the types and concentrations found. It is recommended that the carpet in the classrooms be removed and replaced with vinyl composite tile. The allergenic load of the carpet is such that the contractor should vacuum all carpets with a HEPA-filtered vacuum cleaner prior to beginning any carpet removal. The carpets should be cut into manageable sections with a razor knife prior to breaking the adhesive bond with the floor. Remove the carpets using wet methods for dust control.

The contractor should only wet the carpet that is immediately going to be removed. Wet carpets should not be allowed to remain in place on the floors. After removal, the carpet strips should be rolled, placed into plastic bags and physically removed from the building. The contractor should then remove the carpet adhesive. The room should remain undisturbed for one day. The following day, HEPA vacuum the floor. This should remove the majority of the spore load under the carpet and those previously airborne now settled on the floor. Personnel removing the carpets in any area of the school should use this procedure and wear an N-95 filtering facepiece during that work. This work can be performed by the general contractor or a demolition contractor. A special environmental contractor is not required to remove the carpets.

During the upcoming demolition and construction work, the contractor(s) should maintain good general housekeeping. They should minimize dust disturbance. They should wet-wipe visibly dusty fixtures, objects and equipment prior to removing them. They should keep the floors as free of dust as is practicable. Upon completion, the contractor should ensure that the school is in clean-as-new condition. General housekeeping-type clean up procedures will be sufficient for this task – sweep and mop floors, damp-wipe other horizontal surfaces (including the relocated furniture) to remove construction dust, and ensure that duct interiors are free of dust and debris and that HVAC diffusers are clean.

Following completion of the HVAC and flooring project in each phase, and cleanup of construction dust, follow-up air sampling should be performed. Air sampling is recommended at the completion of the project as opposed to immediately following carpet removal for two reasons. 1) Sampling immediately after carpet removal will only give results for that particular moment in time. The contractor will then proceed to demolish the HVAC system, demolish block walls above the corridors, and track in and out of the building, thus rendering those samples no longer representative of the state of the building. 2) The reason for performing air sampling after completion is to test the end product of the renovation project, just prior to turn-over. This is the industry standard protocol.

This sampling will consist of collecting spore trap air samples in each wing of the building plus viable fungal air samples in the A-wing. Cultured samples are recommended in the A-wing to screen for *Aspergillus* and *Stachybotrys* previously recovered in this area. Spore trap sampling will enable the B and C wing samples to be analyzed more rapidly (two days to results). Acceptable

sample results will show that indoor air microbial concentrations are lower than the outdoor air concentrations, and that the genus distributions and relative concentrations are consistent between indoor and outdoor samples, as determined by a microbiology specialist.

## 1.0 INTRODUCTION

In our continuing service to the U.S. Army Corps of Engineers, Baker and Associates, Inc. (Baker) was contracted to perform an indoor air quality (IAQ) follow-up investigation at Brittin Elementary School (BES), located at Fort Stewart, Georgia. Baker's team of investigators consisted of Mr. Warren Lehew, CIH, CSP[1] from Baker Environmental, and Ms. Suzanne Blevins, SM (ASCP)[2] from Aerobiology Laboratory Associates, Inc.

## 2.0 BUILDING DESCRIPTION AND BACKGROUND

### Building Description

Building 7392, the main building at Brittin Elementary School, was constructed in 1981. The exterior walls of this building are brick, and the interior walls are cinder block. Interior finishes in each classroom consist of carpeted floors and fiberglass ceiling tiles. The floors in the corridors are finished with vinyl floor tiles. The building is heated and cooled by air-to-water heat pumps located above the central corridor. The heating, ventilating, and air conditioning (HVAC) enclosure in each room consists of perforated corrugated metal that is lined on the inside with fiberglass. Each classroom has its own heat pump and fan unit. These units do not have any associated outside air intakes. Return air from a classroom is drawn into the over-corridor plenum where it is mixed with the return air from the classroom directly across the corridor. The air is then drawn through the heat pumps and sent back into the classrooms.

The building is in the beginning phases of a proposed mechanical systems renovation. At the time of the investigation, replacement of the existing HVAC system had not yet begun, however, the high windows and associated exhaust fans in the clerestory have been completely removed and replaced with aluminum, insulated panels and air intake / relief louvers. The louvers are part of the forthcoming mechanical renovation and are currently blanked off airtight pending the construction of the designed replacement HVAC system. In most of the classrooms, the only source of fresh

1 Certified Industrial Hygienist, Certified Safety Professional

2 Specialist in Microbiology, American Society for Clinical Pathology

(outside) air is through the fire exits – low windows located in the perimeter walls. In the past, these windows had frequently been left open to provide fresh air. Following the attacks on September 11, 2001, implementation of additional force protection requirements at Fort Stewart prohibited these fire exits being left open for ventilation.

There are three portable trailer units on site which each contain two classrooms (Rooms T1 through T6). The trailers are located to the west of C wing. Interior finishes in the trailers include carpeted floors and wood walls and ceilings.

**Background**

Complaints of odors, rashes, respiratory irritation, skin and eye irritation, and headache were received from both students and staff since mid September, 2001. In December, 2001, a team from Baker inspected the school, interviewed affected staff, and collected various air samples. The findings and conclusions of that investigation are contained in Baker's January, 2002 Indoor Air Quality Investigation Report. The recommendations at that time were to proceed with installation of the new HVAC system, and in the interim, implement temporary measures to provide fresh air to the classrooms, including force-ventilating with box fans through the fire escapes. After the report, the school started to implement the interim measures to dilute indoor air contaminants by opening the fire windows and force-ventilating the rooms with box fans. There were a total of 5 IAQ complaints in November, 19 in December, one in January, 14 in February, and 172 in March. As a result of the dramatic increase in IAQ-related complaints from both staff and students, Baker was asked to perform this follow-up investigation and to conduct more extensive testing and a more invasive building inspection. This follow-up investigation was conducted from 1 April to 3 April, 2002, during the Spring break when students and teachers would not be present.

## 3.0 OBSERVATIONS

The school appeared to be in good condition and well-maintained with few exceptions. A janitorial contractor cleans each classroom nightly, emptying the trash and vacuuming the carpet. "Low level cleaning," dusting desks, bookshelves and other surfaces below seven feet high, is performed weekly

in each classroom. "High level cleaning" is performed annually and consists of cleaning window blinds and surfaces higher than seven feet.

A sewage treatment facility is located approximately 0.7 mile southwest from the school. Baker interviewed Mr. Robert Norby, the supervisor of the facility. The sewage treatment plant was built in 1984. They stopped using chlorine in September, 1998. Currently, they do not use any chemicals or enzymes to treat the sewage. Raw sewage is initially placed into a settling tank where it is dewatered. The water flows through a trickle filter, is disinfected using ultraviolet light, and is discharged into Taylor's Creek, which flows away from the Brittin school. Solids are taken to an offsite sanitary landfill.

## 4.0 DESCRIPTION OF SAMPLING AND ANALYSIS METHODS

Carbon dioxide, carbon monoxide, temperature, and relative humidity measurements were taken in several of the classrooms to represent levels throughout the empty building. These direct-read measurements are "snapshot" measurements which identify the levels only at the time of testing. These parameters were measured using a TSI Q-Trak Model 8551 IAQ Monitor with CO. The concentrations were manually recorded at each sampling location after allowing the reading to stabilize. These measurements have been sorted and are listed in Table 1.

Samples to determine airborne fiber concentrations were collected by using an electric sampling pump to draw air through 0.8 micron pore size mixed cellulose ester filters. The samples were sent to Schneider Laboratories, Inc., in Richmond, VA, for analysis using NIOSH[3] Method 7400 for airborne fibers. Sample results are given in fibers per cubic centimeter of air (f/cc), and are listed in Table 2.

Bulk, wipe and tape lift samples of materials were collected for direct microscopic exam for fungal spores and for fungal culture and identification. The samples were collected by cutting or wiping the material to be sampled and placing the piece of material or the exposed swab into a new zipper-close plastic bag, or by using clear adhesive tape to lift dust from the surface of the material. The

3 National Institute for Occupational Safety and Health

samples were sent to Aerobiology Laboratory Associates, Inc., of Reston, VA, for microscopic examination and / or culture and incubation on a nutrient agar (a gelatin-like, nutrient-rich base). The samples are counted and identified by trained and certified microbiologists. The results of the samples from building materials are listed in Table 3. The results of the wipe samples from students and teachers belongings are listed in Table 9.

Air samples for fungal and bacterial culture and identification were collected by using an electric sample pump to draw a known volume of air through a single-stage microbial sampler and allowing it to impact onto petri dishes filled with various nutrient agars. At each sampling location, three petri dishes were exposed in this manner, one for bacteria, one for average fungi and one for xerophyllic fungi (fungi which grow well under relatively dry conditions). The samples were sent to Aerobiology Laboratory Associates, Inc. for incubation, followed by counting and identification by trained and certified microbiologists. The results of these samples are listed in Table 4 for fungal results, and in Table 5 for bacterial results.

Air samples to evaluate the total concentration of airborne fungal spores and hyphal elements (the "root systems" of molds) were collected by using a Burkard Personal Spore Trap to draw a known volume of air through a narrow slit and allowing it to impact onto a glass microscope slide coated with a clear adhesive grease. The samples were sent to Aerobiology Laboratory Associates, Inc. for microscopic examination by trained and certified microbiologists. The results of these samples are listed in Table 6.

Carpet vacuum samples were collected by using an electric sample pump to draw air through 0.8 micron pore size mixed cellulose ester filters, and using the filter and housing as a vacuum cleaner to collect dust and dirt from the carpets. The samples were sent to Aerobiology Laboratory Associates, Inc. for microscopic examination. The samples were then cultured and incubated on nutrient agar, followed by counting and identification by trained and certified microbiologists. The samples from Rooms B6 and C3 were also analyzed for dust mite allergens. The results of these samples are listed in Table 7.

Air samples for formaldehyde were collected by using UMEx 100 passive samplers. The samplers contain a tape impregnated with 2,4-dinitrophenylhydrazine (DNPH), which chemically reacts with

formaldehyde in the air. The samplers have a known effective sampling rate, and were exposed for a known time. After sampling, the samplers were sent on ice to Schneider Laboratories, Inc, for formaldehyde analysis using NIOSH Method 2016. The analysis reports the concentration of formaldehyde in parts of contaminant per million parts of air (ppm). The results of these samples are listed in Table 8.

## 5.0 DISCUSSION OF SAMPLING RESULTS

The results of all samples have been compiled into Tables 1 through 9 for ease of reference, as described in Section 4. The microbiology laboratory Certificates of Analysis are located in the appendices of Attachment A. The chemical laboratory Certificates are located in Attachment B.

**IAQ Parameters**: (Table 1) temperature, relative humidity, carbon monoxide and carbon dioxide measurements were within acceptable bounds in all locations measured. Temperature measurements, both outdoor and indoor, were between 70° and 73°. Outdoor relative humidity was measured at 77%. Indoor relative humidity was measured between 46% and 52%. The indoor temperature and humidity measurements are within the limits recommended by ASHRAE[4]. Carbon monoxide was not detected at levels above the $\pm$ 3 ppm measurement error range of the instrument. The outdoor air was measured at approximately 380 ppm carbon dioxide. Indoor levels were consistently measured at or below 600 ppm. Most of the measurements were in the 400 to 500 ppm range. This is below the 1000 ppm level above which indoor air quality complaints would be expected. Because no students or staff were present during this investigation, elevated carbon dioxide levels were not anticipated.

**Airborne Fibers**: (Table 2) all samples collected were below the proposed OSHA[5] Permissible Exposure Limit (PEL) of 1.0 f/cc for synthetic vitreous fibers by more than a factor of 100. All sample results were also below the laboratory limit of detection.

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4 American Society of Heating, Refrigerating and Air-conditioning Engineers

5 Occupational Safety and Health Administration

**Formaldehyde Samples**: (Table 8) formaldehyde was identified near the limit of detection in five of the 17 samples. Samples from rooms C1, C3, T4 and Media Center had formaldehyde detected (two samples were collected in room C3). The concentrations identified were 0.025 ppm in C1, 0.029 ppm and 0.030 ppm in C3, 0.026 ppm in T4, and 0.027 ppm in the Media Center. Each of these measurements exceeds the NIOSH Recommended Exposure Level (REL) for formaldehyde of 0.016 ppm. Each sample was collected over a seven to eight hour period. For comparison, the formaldehyde concentrations identified during the December investigation were 0.0414 ppm in Room C3, 0.0382 ppm in Room B6, and 0.0271 ppm in Room A10.

Formaldehyde and acetaldehyde are constituents of cigarette smoke. Formaldehyde is used in pressed wood products, textiles, glues, paints and coatings, and may be used as a preservative or disinfectant in cosmetics, foodstuffs (cheese), cleaning fluids, dyes, inks, medicinals and dentrifices. Formaldehyde is a primary irritant to mucous membranes of the nasal and oral passages, the upper respiratory tract and exposed skin. Formaldehyde can elicit an allergic reaction upon repeated exposure. The exposure to formaldehyde need not be intense. Sensitization has arisen when exposure was incurred while wearing permanent press fabric impregnated with a formaldehyde-melamine resin[6]. According to the National Safety Council's IAQ Fact Sheet: Formaldehyde (January 7, 2002), some people are very sensitive to formaldehyde, and can experience symptoms at levels below 0.1 ppm. The World Health Organization's recommended limit for exposure to formaldehyde is 0.05 ppm.

**Microbiological Samples**: (Tables 3 through 7) Aerobiology Laboratory Associates, Inc. has prepared a separate report which addresses their microbiology sample findings. The full report is located in Attachment A. A summary of their findings is presented below. Their analyses dealt with viable fungal spores (spores which can be grown under good conditions), non-viable fungal spores and hyphae (spores and fungal elements which, though present, will not grow even under good conditions), viable bacteria, and dust mite allergens.

**Viable Bacterial and Fungal Air Sample Results**: Representative areas of Wing A, Wing B, Wing C and all of the trailers were tested for concentration and types of airborne bacteria. Bacteria are

6 Patty's Industrial Hygiene and Toxicology, Volume II, Part A, 4th Edition, 1993, John Wiley & Sons

extremely small (0.4 – 10 microns), single-cell microscopic organisms. They are the most numerous organisms on earth and are formed everywhere, especially in soil. Because they are microscopic, they are easily airborne, and they are carried in water as well. Certain types of bacteria are inherent to particular environments, i.e., water bacteria, soil bacteria, human-commensal bacteria, pathogenic bacteria, and many more distinct niches.

The types and concentrations of bacteria found during the sampling event of April 1 and April 2 do not indicate elevated levels of bacteria, nor do they show indicator types of bacteria typically associated with indoor air quality complaints or water related issues. All of the bacteria recovered from the air in all of the classrooms and trailers are those associated with human activity, such as *Coagulase-negative Staphylococcus, Micrococcus species, Corynebacterium species* or those introduced from outdoor reservoirs, i.e., *Bacillus species, Streptomyces species* and non-fermentative gram-negative rods, which are typically found in soil. The concentrations are very low for an elementary school. Of note is that there was no activity in the school for three days prior to testing which would result in slightly lower airborne levels. The consistent absence of gram-negative rods indicates that there are no current wet reservoirs in the occupied spaces within the school or trailers that could support elevated levels of bacterial growth. Gram-negative rods are a category of organisms widely distributed on plants and in soil, water, and the intestines of humans and animals. Some species occupy very limited ecological niches. Non-fermentative gram-negative rods are a group of environmental organisms within the larger category of gram-negative rods, found in water and soil and on plants, including fruits and vegetation. They are distributed worldwide.

The same areas were sampled for airborne types and concentrations of fungi. Fungi are primitive plants that lack chlorophyll and therefore must live as parasites or feed on organic matter that they digest externally and absorb. Fungal spores are ubiquitous in the environment, and are drawn into buildings through open doors or windows or through HVAC system air intakes, or are carried in on human clothing and belongings. True fungi include yeast, mold, mildew, rust, smut and mushrooms. In buildings, fungal growth is commonly associated with high moisture levels that can be the result of water coming in from the outside, through floors, walls or roof; plumbing leaks; or even moisture produced by people through daily activities. Moisture can accumulate when there is not enough ventilation to expel that moisture.

The results of the viable fungal air samples taken in the trailers indicate the repeated presence of several *Aspergillus* and *Penicillium* species, although in low levels. These organisms were not present in the outdoor sample taken on the same day.

The viable fungal results for air samples taken in the C Wing and the B Wing do not indicate elevated levels. The types and concentrations found reflect the types and concentrations found in the outdoor sample taken on the same day.

The viable fungal results for air samples taken in the A Wing indicate the repeated presence of several indicator molds related to indoor air quality issues. *Stachybotrys, Chaetomium, Aspergillus* (multiple species) and *Trichoderma* were found in all seven of the classrooms tested. The levels, however, were low and ranged from 14 colony forming units per cubic meter of air to 91 colony forming units per cubic meter of air.

**Spore Trap Results**: The spore trap results taken by the Burkard Personal Spore Trap are used to support the viable fungal results. Spore trap samples were taken in all locations where viable fungal samples were taken. Results of spore trap analysis from Wings A, B, and C do not indicate elevated levels of total spore concentration, nor do they identify areas that contain "indicator" spores, i.e., *Stachybotrys, Chaetomium* or *Penicillium/Aspergillus* group spores.

The spore trap results from the trailers do indicate very high levels of *Stachybotrys, Chaetomium, Trichoderma* and *Penicillium/Aspergillus* group spores.

**Bulk Dust Sample Results**: Carpet dust samples were collected for direct microscopic examination and fungal culture in Wing A, Wing B, Wing C, and the trailers.

Results from Wing A range from 130,000 colony forming units per gram (cfu/g) to $1.9 \times 10^6$ cfu/g in Room A8. Results from Wing B range from 120,000 cfu/g to $3.1 \times 10^6$ cfu/g in Room B6. Results from Wing C range from 30,000 cfu/g to $2.9 \times 10^6$ cfu/g in Room C12. Results from the trailers range from 130,000 cfu/g to 550,000 cfu/g in Room T3.

The carpet in Brittin Elementary School is approximately 10 to 12 years old. The levels found range from what is considered "low" to what is considered "high". The majority of the organisms found in the carpet dust are comprised of agricultural type spores; not those that are indicators of water events. They can be allergenic in nature. Often levels can accumulate to these numbers based on housekeeping practices in place, the type of activity in the area (classrooms, library), or the age of the carpet. What is noted, however, is that the levels are consistently higher in the back or center of the classroom compared to the front or entrance of the classroom. The housekeeping staff may vacuum the entrance into the classroom more aggressively because of the obvious level of dirt tracked in from outside.

The OSHA Technical Manual states, "Contamination Indicators: 1,000,000 fungi per gram of dust or material." The University of Minnesota guidelines state, "Microbial fungus levels more than 100,000 cfu/g have the potential of significantly contributing to airborne populations. Certain organisms like *Aspergillus, Penicillium* and *Stachybotrys* need attention at relatively low concentrations. Levels above 5000 cfu/g when *Aspergillus, Penicillium* and *Alternaria* are the predominate organisms is of concern."

**Dust Mite Results**: The carpet at the entrance and back of Classrooms C3 and B6 were sampled for dust mite allergens. All results came back below the detection limit of the test (<1.6 µg/g), indicating that there is not an elevated level of dust mite allergens present in these two rooms. An allergen concentration of 2 µg/g may be considered an action level for dust mite group I (Der p I or Der f I) that identifies an environment where an allergic patient is at increased risk for symptoms. Greater than 100 µg/g presents a high risk for symptoms.

**Trailer Wipes and Bulks**: All of the wipe and bulk direct and culture samples taken from all six of the trailers indicate high concentrations of mold and the presence of *Stachybotrys, Chaetomium, Trichoderma,* multiple *Aspergillus* species, *Penicillium, Fusarium* and yeast. The mold is visible, actively growing on multiple types of building materials in all of the trailers.

**Wipe Samples of Belongings**: Surface wipe samples were taken in Room C3, Room A10, Room A11, Room A13, and Room T6. These wipes were taken from surfaces of materials that were scheduled to leave that particular classroom and go to a new teaching site. The concern was that

they would be contaminating the new site. The results from all five classrooms indicate that the contents to be moved do not contain elevated levels of "indicator" spores. They do contain levels of agricultural and typical indoor spores that have been deposited by the HVAC system, activity in the classroom and housekeeping practices. These organisms at any level may be allergenic to those persons with documented allergies.

## 6.0 CONCLUSIONS

The temperature, relative humidity, carbon monoxide and carbon dioxide levels were within the acceptable range for human comfort. Airborne fibers were not detectable.

Formaldehyde was identified above the laboratory detection limit in four rooms. Formaldehyde is a primary irritant as well as a sensitizing agent which can elicit an allergic reaction at low level exposures. Some potential sources of formaldehyde may be present in the classrooms. Since the building is 20 years old, it is expected that the majority of the off-gassing of formaldehyde from these sources will have already occurred. However the potential presence of these sources combined with a 100% recycling HVAC system and the force protection requirements to keep the windows closed after September 11, 2001 may have allowed formaldehyde to accumulate in the classrooms to a level that could irritate an already sensitized person.

There does not appear to be a bacterial or dust mite related indoor air quality issue in any area of Brittin Elementary School that was sampled.

The spore traps taken in Wings A, B, and C do not show elevated levels of fungal spores present in the air. The spores identified reflect that of the outdoor environment and are of agricultural origin.

The viable airborne fungal results show typical indoor levels and types of fungi in Wings B and C. The fungi found inside reflect the fungi found in the outdoor control. There is no evidence of airborne fungal amplification in these wings.

The viable airborne fungal results for Wing A indicate low levels of *Stachybotrys, Chaetomium,* and mixed *Aspergillus species* in several classrooms. The older students in this wing rotate in and out

of the trailers. There does not appear to be a reservoir in any of these classrooms. It is more than likely that these indicator organisms have been carried into the A wing from the trailers on the students' clothing, school-related items, and personal items.

All six rooms in the trailers have visible reservoirs of mold. The viable airborne cultures, the spore traps, the bulk materials and wipes all show elevated levels of potential mycotoxigenic and allergenic molds.

The carpet dust samples indicate a range of fungal concentrations. The numbers range from 30,000 cfu/g to 3.1 x $10^6$ cfu/g in all three wings of the school and the trailers. There is no concentration of "indicator" mycotoxigenic fungi present, but *Cladosporium,* which can be allergenic, is present in most of the samples at significant concentrations. Therefore, this is a potential exposure issue for allergic and asthmatic occupants. The University of Minnesota guidelines state, "Microbial fungus levels more than 100,000 cfu/g have the potential of significantly contributing to airborne populations." The presence of carpet dust fungal concentrations in excess of ten times this level, combined with a 100% recirculating HVAC system, is likely to have been a significant contributing factor to the symptoms reported by the school occupants.

Wipe samples taken from the contents of Room C3, Room A10, Room A11, Room A13, and Room T6 indicated levels of typical indoor and outdoor spores that were deposited on the materials. There was no evidence of amplification on these materials, and moving the contents off-site would not be a problem.

## 7.0 RECOMMENDATIONS

Based on the observations and sample results presented in the preceding sections, Baker makes the following recommendations.

The trailers should not be used for classrooms or any other function. Non-porous materials may be removed after being cleaning by trained individuals with appropriate personal protection (N, R or P-100 respirator, gloves, eye protection and disposable protective clothing). Porous material should

be disposed of. If porous material must be recovered, HEPA[7] vacuum the material, wipe down, dry and HEPA vacuum one more time. Resample using the same sampling protocol. The presence of any amount of the indicator organisms, i.e. *Aspergillus, Penicillium, Stachybotrys, Chaetomium, Tricoderma,* or *Fusarium* would prohibit the further use of the material until additional cleaning is performed.

The contents of the main building classrooms that are relocating can be cleaned by HEPA vacuuming porous materials and wiping down non-porous materials with a mild detergent. Resampling would not be necessary for these items.

The carpet is a reservoir for multiple types of allergens. The levels are due to the age of the carpet, the type of activity, the allergen loading caused by the lack of fresh air, recirculation of return air and the geographic area that has high fungal concentrations most of the year. All these contribute to the types and concentrations found. It is recommended that the carpet in the classrooms be removed and replaced with vinyl composite tile. The allergenic load of the carpet is such that the contractor should vacuum all carpets with a HEPA-filtered vacuum cleaner prior to beginning any carpet removal. The carpets should be cut into manageable sections with a razor knife prior to breaking the adhesive bond with the floor. Remove the carpets using wet methods for dust control. The contractor should only wet the carpet that is immediately going to be removed. Wet carpets should not be allowed to remain in place on the floors. After removal, the carpet strips should be rolled, placed into plastic bags and physically removed from the building. The contractor should then remove the carpet adhesive. The room should remain undisturbed for one day. The following day, HEPA vacuum the floor. This should remove the majority of the spore load under the carpet and those previously airborne now settled on the floor. Personnel removing the carpets in any area of the school should use this procedure and wear an N-95 filtering facepiece during that work. This work can be performed by the general contractor or a demolition contractor. A special environmental contractor is not required to remove the carpets.

During the upcoming demolition and construction work, the contractor(s) should maintain good general housekeeping. They should minimize dust disturbance. They should wet-wipe visibly dusty

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7 High Efficiency Particulate Air filters are 99.97% effective on particles 0.3 micron diameter.

fixtures, objects and equipment prior to removing them. They should keep the floors as free of dust as is practicable. Upon completion, the contractor should ensure that the school is in clean-as-new condition. General housekeeping-type clean up procedures will be sufficient for this task – sweep and mop floors, damp-wipe other horizontal surfaces (including the relocated furniture) to remove construction dust, and ensure that duct interiors are free of dust and debris and that HVAC diffusers are clean.

Following completion of the HVAC and flooring project in each phase, and cleanup of construction dust, follow-up air sampling should be performed. Air sampling is recommended at the completion of the project as opposed to immediately following carpet removal for two reasons. 1) Sampling immediately after carpet removal will only give results for that particular moment in time. The contractor will then proceed to demolish the HVAC system, demolish block walls above the corridors, and track in and out of the building, thus rendering those samples no longer representative of the state of the building. 2) The reason for performing air sampling after completion is to test the end product of the renovation project, just prior to turn-over. This is the industry standard protocol.

This sampling will consist of collecting spore trap air samples in each wing of the building plus viable fungal cultures air samples in the A-wing. Cultured samples are recommended in the A-wing to screen for *Aspergillus* and *Stachybotrys* previously recovered in this area. Spore trap sampling will enable the B and C wing samples to be analyzed more rapidly (two days to results). Acceptable sample results will show that indoor air microbial concentrations are lower than the outdoor air concentrations, and that the genus distributions and relative concentrations are consistent between indoor and outdoor samples, as determined by a microbiology specialist.

# TABLES

# TABLES 1 – 9

# LABORATORY RESULT SUMMARY TABLES

## Table 1
## Carbon Dioxide, Carbon Monoxide, Temperature and Humidity Measurements

| Location | Date | Time | CO2 (ppm) | CO (ppm) | Temp. (F) | Humidity (%) | Comments |
|---|---|---|---|---|---|---|---|
| Outside | 4/3/02 | 9:03 | 383 | 1 | 71 | 77 | |
| Room C1 | 4/3/02 | 9:06 | 472 | 2 | 71 | 52 | Unoccupied - Spring Break |
| Room C2 | 4/3/02 | 9:21 | 469 | 2 | 71 | 47 | Unoccupied - Spring Break |
| Room C3 | 4/3/02 | 9:31 | 483 | 2 | 70 | 46 | Unoccupied - Spring Break |
| Room C4 | 4/3/02 | 9:46 | 600 | 2 | 70 | 49 | Unoccupied - Spring Break |
| Room B6 | 4/3/02 | 9:59 | 504 | 2 | 73 | 48 | Unoccupied - Spring Break |
| Room B8 | 4/3/02 | 10:16 | 490 | 2 | 72 | 46 | Unoccupied - Spring Break |
| Room A10 | 4/3/02 | 10:24 | 440 | 2 | 72 | 46 | Unoccupied - Spring Break |

## Table 2
## Airborne Fiber Sample Results

| Location | Date | Fiber Count (f/cc) | Comments |
|---|---|---|---|
| Room A4 | 4/3/02 | <0.004 | Unoccupied - Spring Break |
| Room A7 | 4/3/02 | <0.005 | Unoccupied - Spring Break |
| Room A11 | 4/3/02 | <0.006 | Unoccupied - Spring Break |
| Room B5 | 4/3/02 | <0.004 | Unoccupied - Spring Break |
| Room B6 | 4/2/02 | <0.003 | Unoccupied - Spring Break |
| Room B12 | 4/3/02 | <0.005 | Unoccupied - Spring Break |
| Room C2 | 4/2/02 | <0.003 | Unoccupied - Spring Break |
| Room C3 | 4/2/02 | <0.003 | Unoccupied - Spring Break |
| Room C12 | 4/2/02 | <0.003 | Unoccupied - Spring Break |

## Table 3
## Results of Environmental Bulk and Tape Samples

| Sample No. | Location | Sample Description | Direct Exam Results | Sample Culture Results |
|---|---|---|---|---|
| T4302-1 | Room A10 | Composite tape lift, under carpet by door | Occasional Basidiospores Seen<br>Occasional Hyphal Elements Seen | |
| 040202-01 | Room B8, Under Sink | Wipe sample under the sink | Moderate Basidiospores Seen | |
| 040202-02 | Room B8, Under Sink | Wipe sample under the sink | Numerous Basidiospores Seen<br>Occasional Epicoccum Spores Seen<br>Moderate Hyphal Elements Seen | |
| 040202-03 | T6, Front of Paneling | Wipe sample, front of paneling | Numerous Chaetomium Spores and Hyphae Seen<br>Numerous Cladosporium Spores Seen<br>Moderate Hyphal Elements Seen | |
| 040202-04 | T6, Back of Paneling | Wipe sample, back of paneling | Numerous Chaetomium Spores and Hyphae Seen<br>Numerous Penicillium / Aspergillus Group Spores Seen<br>Numerous Hyphal Elements Seen | |
| 040202-05 | Room B8 | Wipe sample, soccer ball | Few Drechslera / Bipolaris Group Spores Seen<br>Few Chaetomium Spores and Hyphae Seen<br>Occasional Ascospores Seen<br>Few Pollen Grains Seen<br>Occasional Epicoccum Spores Seen | |
| 040102/-01 | Trailer 1 | Drywall & Insulation Over Door Area | Numerous Chaetomium Spores and Hyphae Seen<br>Moderate Penicillium / Aspergillus Group Spores Seen<br>Growth of Trichoderma Species Noted<br>Quantitation not possible | Trichoderma Species<br>Chaetomium Species<br>Aspergillus Species<br>Sterilia Mycelia |
| 040102/-02 | Trailer 1 | Drywall | Numerous Chaetomium Spores and Hyphae Seen<br>Few Stachybotrys Spores Seen<br>Growth of Trichoderma Species Noted<br>Quantitation not possible | Trichoderma Species<br>Penicillium Species<br>Chaetomium Species<br>Sterilia Mycelia |
| 040102/-03 | T1 | Drywall Over Window | Numerous Stachybotrys Spores and Hyphae Seen<br>Few Chaetomium Spores Seen<br>Growth of Trichoderma Species Noted<br>Quantitation not possible | Trichoderma Species<br>Penicillium Species<br>Chaetomium Species<br>Sterilia Mycelia |



CFU = COLONY FORMING UNITS

## Table 3
## Results of Environmental Bulk and Tape Samples

| Sample No. | Location | Sample Description | Direct Exam Results | Sample Culture Results |
|---|---|---|---|---|
| 040102/-04 | T2 | Drywall Under Molding Near Teacher's Desk | Numerous Chaetomium Spores and Hyphae Seen | 3,900,000 CFU / gram<br>Aspergillus Ustus - 71%<br>Penicillium Species - 29% |
| 040102/-05 | T2 | Wood From Window Sill | Numerous Brown Unidentified Spores Seen | 12,000 CFU / gram<br>Acremonium Species - 63%<br>Aspergillus Ustus - 35%<br>Penicillium Species - 2% |
| 040102/-06 | T1 | Wipe - Molding Door Side | Numerous Chaetomium Spores and Hyphae Seen<br>Moderate Penicillium / Aspergillus Group and Colorless Spores Seen<br>Growth of Trichoderma Species Noted<br>Quantitation not possible | Trichoderma Species<br>Penicillium Species<br>Sterilia Mycelia |
| 040102/-07 | T1 | Wipe - Drywall Over Window | Numerous Stachybotrys Spores and Hyphae Seen<br>Few Chaetomium and Colorless Spores Seen | 17,000 CFU / square inch<br>Aspergillus Species - 33%<br>Aspergillus Ustus - 30%<br>Aspergillus Sydowii - 24% |
| 040102/-08 | T1 | Wipe - Molding Window Side | Numerous Stachybotrys Spores and Hyphae Seen<br>Few Chaetomium Spores Seen | 3,300 CFU / square inch<br>Chaetomium Species - 42%<br>Aspergillus Terreus - 15%<br>Aspergillus Sydowii - 15% |
| 040102/-09 | T2 | Wipe - Paneling | Moderate Chaetomium Spores and Hyphae Seen<br>Few Penicillium / Aspergillus Group and Colorless Spores Seen | 13,000 CFU / square inch<br>Chaetomium Species - 100% |
| 040102/-10 | T2 | Wipe - Paneling | Numerous Chaetomium Spores and Hyphae Seen<br>Moderate Large Brown Unidentified Spores Seen | |
| 040102/-11 | T2 | Wipe - Window Sill Near Teacher's Desk | Numerous Brown Unidentified Spores Seen | |
| 040102/-12 | T1 | Wipe - Under Molding Near Door | Numerous Chaetomium Spores and Hyphae Seen<br>Numerous Trichoderma Spores Seen | |
| 040102/-13 | T1 | Wipe - Ceiling Tile Near Door | Numerous Trichoderma Spores Seen<br>Moderate Chaetomium Spores Seen | |



CFU = COLONY FORMING UNITS

## Table 3
## Results of Environmental Bulk and Tape Samples

| Sample No. | Location | Sample Description | Direct Exam Results | Sample Culture Results |
|---|---|---|---|---|
| 040202-01 | T3 | Drywall over Copier | Numerous Aspergillus Spores and Conidiophores Seen<br>Numerous Chaetomium Spores and Hyphae Seen | 17,000,000 CFU / gram<br>Aspergillus Species - 100% |
| 040202-02 | T3 | Drywall over Corkboard | Numerous Stachybotrys Spores and Hyphae Seen | 41,000 CFU / gram<br>Aspergillus Species - 81%<br>Sterilia Mycelia - 17%<br>Paecilomyces Species - 2% |
| 040202-03 | T3 | Ceiling over Gray Locker | No Fungal Spores Seen | 140,000 CFU / gram<br>Aspergillus Species - 93%<br>Paecilomyces Species - 4%<br>Penicillium Species - 2% |
| 040202-04 | T4 | Drywall over Window | Numerous Chaetomium Spores and Hyphae Seen<br>Numerous Penicillium / Aspergillus Group Spores Seen | 1,400,000 CFU / gram<br>Aspergillus Species - 69%<br>Chaetomium Species - 18%<br>Sterilia Mycelia - 10% |
| 040202-05 | T4 | Paneling Near Teacher's Desk | Numerous Dark Hyphal Elements Seen<br>Few Brown Unidentified Spores Seen | 390,000 CFU / gram<br>Yeast - 56%<br>Fusarium Species - 33%<br>Penicillium Species - 11% |
| 040202-06 | T4 | Ceiling around Diffuser | Few Stachybotrys Spores Seen | 180,000 CFU / gram<br>Yeast - 97%<br>Penicillium Species - 2%<br>Aspergillus Species - 1% |
| 040202-07 | T4 | Ceiling over Teacher's Desk | Moderate Stachybotrys Spores Seen | 250,000 CFU / gram<br>Aspergillus Species - 56%<br>Penicillium Species - 20%<br>Chaetomium Species - 13% |
| 040202-08 | T4 | Drywall over Chalkboard | Numerous Stachybotrys Spores and Hyphae Seen<br>Moderate Penicillium / Aspergillus Group Spores Seen | 120,000 CFU / gram<br>Stachybotrys Chartarum - 50%<br>Aspergillus Species - 50% |



CFU = COLONY FORMING UNITS

## Table 3
## Results of Environmental Bulk and Tape Samples

| Sample No. | Location | Sample Description | Direct Exam Results | Sample Culture Results |
|---|---|---|---|---|
| 040202-09 | T5 | Wallpaper in Restroom Area | Numerous Cladosporium Spores and Hyphae Seen | 210,000 CFU / gram<br>Yeast - 94%<br>Cladosporium Species - 4%<br>Aspergillus Species - 2% |
| 040202-10 | T5 | Restroom Ceiling | Numerous Cladosporium Spores and Hyphae Seen | 530,000 CFU / gram<br>Paecilomyces Species - 69%<br>Cladosporium Species - 31% |
| 040202-11 | T6 | Drywall | Numerous Chaetomium Spores and Hyphae Seen | 950,000 CFU / gram<br>Chaetomium Species - 68%<br>Aspergillus Species - 32% |
| 040202-12 | T6 | Drywall under Paneling | Numerous Aspergillus Spores and Conidiophores Seen<br>Few to Moderate Chaetomium Spores Seen | 5,300,000 CFU / gram<br>Aspergillus Sydowii - 97%<br>Penicillium Species - 2%<br>Trichoderma Species - 1% |
| 040202-13 | T6 | Ceiling Tile | Numerous Trichoderma Spores Seen<br>Few to Moderate Chaetomium Spores Seen<br>Growth of Trichoderma Species Noted | Quantitation not Possible<br>Trichoderma Species - 100% |
| 040202-14 | T6 | Ceiling | Numerous Chaetomium Spores and Hyphae Seen<br>Moderate Penicillium / Aspergillus Group Spores Seen | 740,000 CFU / gram<br>Chaetomium Species - 70%<br>Aspergillus Species - 30% |
| 040202-15 | T6 | Paneling above Door | Numerous Chaetomium Spores and Hyphae Seen | 39,000 CFU / gram<br>Aspergillus Species - 65%<br>Penicillium Species - 20%<br>Trichoderma Species - 15% |
| 040202-16 | T6 | Drywall Over Window | Numerous Chaetomium Spores and Hyphae Seen<br>Numerous Aspergillus Spores and Conidiophores Seen | 1,900,000 CFU / gram<br>Aspergillus Species - 88%<br>Chaetomium Species - 12% |



CFU = COLONY FORMING UNITS

## Table 4
## Results of Air Samples for Fungal Culture and Identification

| Sample No. | Location | Sample Description | Sample Results |
|---|---|---|---|
| 040202-01 | Room A4 | Air | 92 CFU / $m^3$<br>Penicillium Species - 38%<br>Cladosporium Species - 31%<br>Aspergillus Ustus - 31% |
| 040202-02 | Room A5 | Air | 85 CFU / $m^3$<br>Stachybotrys Chartarum - 42%<br>Chaetomium Species - 33%<br>Fusarium Species - 8%<br>Aspergillus Sydowii - 8% |
| 040202-03 | Room A7 | Air | 64 CFU / $m^3$<br>Stachybotrys Chartarum - 22%<br>Aspergillus Ustus - 22%<br>Trichoderma Species - 22%<br>Aspergillus Sydowii - 11% |
| 040202-04 | Room A8 | Air | 14 CFU / $m^3$<br>Stachybotrys Chartarum - 100% |
| 040202-05 | Room A10 | Air | 71 CFU / $m^3$<br>Cladosporium Species - 50%<br>Yeast (mixed species) - 20%<br>Sterilia Mycelia - 20%<br>Stachybotrys Chartarum - 10% |
| 040202-06 | Room 11A | Air | 28 CFU / $m^3$<br>Aspergillus Sydowii - 50%<br>Stachybotrys Chartarum - 25%<br>Sterilia Mycelia - 25% |
| 040202-07 | Room 13A | Air | 50 CFU / $m^3$<br>Aspergillus Sydowii - 29%<br>Stachybotrys Chartarum - 29%<br>Chaetomium Species - 14% |
| 040202-08 | Room A012<br>(Ms. Sharp) | Air | 78 CFU / $m^3$<br>Geotrichum Species - 27%<br>Chaetomium Species - 18%<br>Penicillium Species - 18%<br>Aspergillus Ochraceous - 9% |
| 040202-09 | Outdoor | Air | 400 CFU / $m^3$<br>Cladosporium Species - 58%<br>Sterilia Mycelia - 36%<br>Alternaria Species - 2% |



CFU / $m^3$ = COLONY FORMING UNITS PER CUBIC METER OF AIR

## Table 4
## Results of Air Samples for Fungal Culture and Identification

| Sample No. | Location | Sample Description | Sample Results |
|---|---|---|---|
| 040202-10 | Room A013 (Ms. Lampkin) | Air | 35 CFU / $m^3$<br>Penicillium Species - 40%<br>Cladosporium Species - 20%<br>Trichoderma Species - 20% |
| 040102-1 | Room B6, front of room | Air | 120 CFU / $m^3$<br>Cladosporium Species - 59%<br>Sterilia Mycelia - 35%<br>Epicoccum Species - 6% |
| 040102-2 | Room B6, back of room | Air | 110 CFU / $m^3$<br>Cladosporium Species - 75%<br>Sterilia Mycelia - 25% |
| 040102-3 | Room B5 | Air | 110 CFU / $m^3$<br>Cladosporium Species - 60%<br>Sterilia Mycelia - 33%<br>Penicillium Species - 7% |
| 040102-4 | Room B8 | Air | 92 CFU / $m^3$<br>Cladosporium Species - 38%<br>Sterilia Mycelia - 38%<br>Penicillium Species - 8% |
| 040102-5 | Room B12 | Air | 160 CFU / $m^3$<br>Cladosporium Species - 68%<br>Sterilia Mycelia - 14%<br>Penicillium Species - 9% |
| C3 Front | Room C3, front of room, east side | Air | 110 CFU / $m^3$<br>Cladosporium Species - 75%<br>Sterilia Mycelia - 19%<br>Alternaria Species - 6% |
| C3 Back | Room C3, back of room, center | Air | 150 CFU / $m^3$<br>Cladosporium Species - 90%<br>Sterilia Mycelia - 5%<br>Trichoderma Species - 5% |
| C1 Front | Room C1, front of room, east side | Air | 380 CFU / $m^3$<br>Cladosporium Species - 92%<br>Sterilia Mycelia - 4%<br>Aspergillus Species - 4% |
| C1 Back | Room C1, back of room, center | Air | 240 CFU / $m^3$<br>Cladosporium Species - 88%<br>Sterilia Mycelia - 12% |



CFU / $m^3$ = COLONY FORMING UNITS PER CUBIC METER OF AIR

## Table 4
## Results of Air Samples for Fungal Culture and Identification

| Sample No. | Location | Sample Description | Sample Results |
|---|---|---|---|
| C2 | Room C2 | Air | 420 CFU / $m^3$<br>Cladosporium Species - 92%<br>Sterilia Mycelia - 6%<br>Epicoccum Species - 2% |
| C4 | Room C4 | Air | 99 CFU / $m^3$<br>Cladosporium Species - 71%<br>Sterilia Mycelia - 21%<br>Penicillium Species - 8% |
| C6 | Room C6 | Air | 78 CFU / $m^3$<br>Cladosporium Species - 73%<br>Sterilia Mycelia - 18%<br>Phialomonium-like Species - 9% |
| C12 | Room C12 | Air | 180 CFU / $m^3$<br>Cladosporium Species - 84%<br>Sterilia Mycelia - 12%<br>Penicillium Species - 4% |
| 040102-6 | Outdoor | Air | 330 CFU / $m^3$<br>Cladosporium Species - 85%<br>Sterilia Mycelia - 15% |
| 040102-7 | Room T1 | Air | 64 CFU / $m^3$<br>Aspergillus Terreus - 44%<br>Aspergillus Ustus - 44%<br>Paecilomyces Species - 12% |
| 040102-8 | Room T2 | Air | 190 CFU / $m^3$<br>Cladosporium Species - 42%<br>Aspergillus Terreus - 12%<br>Penicillium Species - 12%<br>Aspergillus Ustus - 4% |
| 040102-9 | Room T3 | Air | 220 CFU / $m^3$<br>Sterilia Mycelia - 66%<br>Cladosporium Species - 21%<br>Aspergillus Ustus - 7% |
| 040102-10 | Room T4 | Air | 78 CFU / $m^3$<br>Cladosporium Species - 55%<br>Aspergillus Versicolor - 18%<br>Penicillium Species - 18% |
| 040102-11 | Room T5 | Air | 160 CFU / $m^3$<br>Sterilia Mycelia - 62%<br>Cladosporium Species - 24%<br>Penicillium Species - 10% |



CFU / $m^3$ = COLONY FORMING UNITS PER CUBIC METER OF AIR

## Table 4
## Results of Air Samples for Fungal Culture and Identification

| Sample No. | Location | Sample Description | Sample Results |
|---|---|---|---|
| 040102-12 | Room T6 | Air | 110 CFU / $m^3$<br>Cladosporium Species - 48%<br>Sterilia Mycelia - 40%<br>Penicillium Species - 13% |



CFU / $m^3$ = COLONY FORMING UNITS PER CUBIC METER OF AIR

## Table 5
## Results of Air Samples for Bacterial Culture and Identification

| Sample No. | Location | Sample Description | Sample Results |
|---|---|---|---|
| 040202-01 | Room A4 | Air | 50 CFU / $m^3$<br>Bacillus Species - 86%<br>Streptomyces Species - 14% |
| 040202-02 | Room A5 | Air | 14 CFU / $m^3$<br>Streptomyces Species - 100% |
| 040202-03 | Room A7 | Air | 7 CFU / $m^3$<br>Bacillus Species - 100% |
| 040202-04 | Room A8 | Air | No Growth |
| 040202-05 | Room A10 | Air | No Growth |
| 040202-06 | Room A11 | Air | 21 CFU / $m^3$<br>Bacillus Species - 100% |
| 040202-07 | Room A13 | Air | No Growth |
| 040202-09 | Outdoor | Air | 7 CFU / $m^3$<br>Coag-negative Staphylococcus Species - 100% |
| 040102-1 | Room B6, front of room | Air | 28 CFU / $m^3$<br>Bacillus Species - 75%<br>Coag-negative Staphylococcus Species - 25% |
| 040102-2 | Room B6, back of room | Air | 36 CFU / $m^3$<br>Bacillus Species - 80%<br>Non-fermentative Gram Negative Rods - 20% |
| 040102-3 | Room B5 | Air | 43 CFU / $m^3$<br>Bacillus Species - 67%<br>Micrococcus Species - 17%<br>Strpetomyces Species - 16% |
| 040102-4 | Room B8 | Air | 28 CFU / $m^3$<br>Coag-negative Staphylococcus Species - 25%<br>Micrococcus Species - 25%<br>Bacillus Species - 25% |
| 040102-5 | Room B12 | Air | 43 CFU / $m^3$<br>Bacillus Species - 66%<br>Non-fermentative Gram Negative Rods - 17%<br>Streptomyces Species - 17% |
| C3 Front | Room C3, front of room, east side | Air | 28 CFU / $m^3$<br>Bacillus Species - 50%<br>Micrococcus Species - 25%<br>Streptomyces Species - 25% |



CFU / $m^3$ = COLONY FORMING UNITS PER CUBIC METER OF AIR

## Table 5
## Results of Air Samples for Bacterial Culture and Identification

| Sample No. | Location | Sample Description | Sample Results |
|---|---|---|---|
| C3 Back | Room C3, back of room, center | Air | 21 CFU / $m^3$<br>Bacillus Species - 34%<br>Coag-negative Staphylococcus Species - 33%<br>Micrococcus Species - 33% |
| C1 Front | Room C1, front of room, east side | Air | 7 CFU / $m^3$<br>Bacillus Species - 100% |
| C1 Back | Room C1, back of room, center | Air | 36 CFU / $m^3$<br>Bacillus Species - 40%<br>Coag-negative Staphylococcus Species - 20%<br>Micrococcus Species - 20% |
| C2 | Room C2 | Air | 50 CFU / $m^3$<br>Bacillus Species - 71%<br>Coag-negative Staphylococcus Species - 29% |
| C4 | Room C4 | Air | 7 CFU / $m^3$<br>Coag-negative Staphylococcus Species - 100% |
| C6 | Room C6 | Air | 21 CFU / $m^3$<br>Bacillus Species - 67%<br>Micrococcus Species - 33% |
| C12 | Room C12 | Air | 50 CFU / $m^3$<br>Bacillus Species - 57%<br>Coag-negative Staphylococcus Species - 29%<br>Streptomyces Species - 14% |
| 040102-6 | Outdoor | Air | No Growth |
| 040102-7 | Room T1 | Air | No Growth |
| 040102-8 | Room T2 | Air | 21 CFU / $m^3$<br>Bacillus Species - 100% |
| 040102-9 | Room T3 | Air | 43 CFU / $m^3$<br>Bacillus Species - 100% |
| 040102-10 | Room T4 | Air | 50 CFU / $m^3$<br>Bacillus Species - 58%<br>Coag-negative Staphylococcus Species - 14%<br>Micrococcus Species - 14% |
| 040102-11 | Room T5 | Air | 43 CFU / $m^3$<br>Bacillus Species - 50%<br>Coag-negative Staphylococcus Species - 17%<br>Streptomyces Species - 17% |
| 040102-12 | Room T6 | Air | 160 CFU / $m^3$<br>Streptomyces Species - 86%<br>Bacillus Species - 14% |



CFU / $m^3$ = COLONY FORMING UNITS PER CUBIC METER OF AIR

## Table 6

## Results of Air Samples for Direct Microscopic Exam (in Spores / $m^3$)

| Spore Identification | Outdoor | Room A012* | Room A013** | Room A4 | Room A5 | Room A7 | Room A8 | Room A10 | Room A11 | Room A13 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cladosporium | 1958 | - | - | - | - | - | - | 11 | 11 | - |
| Ascospores | 1335 | 22 | - | - | - | - | - | 11 | - | - |
| Basidiospores | 178 | - | - | - | - | - | - | - | - | - |
| Smuts, Periconia, Myxomycetes | - | - | - | - | - | - | - | 11 | - | - |
| Penicillium / Aspergillus Group | 356 | - | - | - | - | - | - | - | - | - |
| Alternaria | - | - | - | - | - | - | - | - | - | - |
| Drechslera / Bipolaris Group | - | - | - | - | - | - | - | - | - | - |
| Colorless | - | - | - | - | 11 | - | - | 11 | - | - |
| Curvularia | - | - | - | - | - | - | - | - | - | - |
| Stachybotrys | - | - | - | - | - | - | - | - | - | - |
| Unknown | - | - | 11 | 11 | - | - | - | - | - | - |
| Hyphal Elements | 267 | - | - | - | - | - | - | - | 11 | - |
| Torula Herbarum | 178 | - | - | - | - | - | - | - | - | - |
| Epicoccum | - | - | - | - | - | - | - | - | - | - |
| Pithomyces | - | - | - | - | - | - | - | - | - | - |
| Chaetomium | - | - | 11 | - | - | - | - | - | - | - |
| Nigrospora | - | - | 22 | - | - | - | - | - | - | - |
| Trichoderma | - | - | - | - | - | - | - | - | - | - |
| Ulocladium | - | - | - | - | - | - | - | - | - | - |
| Spegazzinia | - | - | - | - | - | - | - | - | - | - |
| Algae | - | - | - | - | - | - | - | - | - | - |
| Clear Brown | 178 | - | - | - | - | - | - | - | 11 | - |
| **Totals** | 4450 | 22 | 44 | 11 | 11 | <11 | <11 | 44 | 33 | <11 |

* Sample is from the reception area, behind Ms. Sharp's desk.

** Room A013 is Ms. Lampkin's room.



ALL RESULTS ARE LISTED AS NUMBER OF SPORES PER CUBIC METER OF AIR

## Table 6

## Results of Air Samples for Direct Microscopic Exam (in Spores / $m^3$)

| Spore Identification | Room B5 | Room B6 Front | Room B6 Back | Room B8 | Room B12 | Room C1 Front | Room C1 Back | Room C2 | Room C3 Front | Room C3 Back |
|---|---|---|---|---|---|---|---|---|---|---|
| Cladosporium | - | - | - | - | - | - | - | - | 22 | - |
| Ascospores | - | - | - | - | 11 | - | - | - | - | - |
| Basidiospores | - | - | - | - | - | - | - | - | - | - |
| Smuts, Periconia, Myxomycetes | - | 22 | 11 | - | - | - | - | - | 11 | - |
| Penicillium / Aspergillus Group | - | - | - | 22 | - | - | - | - | - | - |
| Alternaria | - | - | - | - | - | - | - | - | - | - |
| Drechslera / Bipolaris Group | - | - | - | - | - | - | - | - | - | - |
| Colorless | - | 22 | - | - | - | - | - | - | - | - |
| Curvularia | - | - | - | - | - | - | - | - | 11 | - |
| Stachybotrys | - | - | - | - | - | - | - | - | - | - |
| Unknown | - | - | - | - | - | - | 11 | - | - | - |
| Hyphal Elements | 33 | - | 11 | - | 11 | - | - | - | 44 | 22 |
| Torula Herbarum | - | - | - | - | - | - | - | - | - | - |
| Epicoccum | - | - | - | - | - | - | - | - | - | - |
| Pithomyces | - | - | - | - | - | - | - | - | - | - |
| Chaetomium | - | - | - | - | - | - | - | - | - | 11 |
| Nigrospora | - | - | - | - | - | - | - | - | - | - |
| Trichoderma | - | - | - | - | - | - | - | - | - | - |
| Ulocladium | - | - | - | - | - | - | - | - | - | - |
| Spegazzinia | - | - | - | - | - | - | - | - | - | - |
| Algae | - | - | - | - | - | - | - | - | - | - |
| Clear Brown | - | - | - | - | - | - | - | - | - | - |
| **Totals** | 33 | 44 | 22 | 22 | 22 | <11 | 11 | <11 | 88 | 33 |

BRITTIN E.S., FORT STEWART, GA

ALL RESULTS ARE LISTED AS NUMBER OF SPORES PER CUBIC METER OF AIR

## Table 6

## Results of Air Samples for Direct Microscopic Exam (in Spores / $m^3$)

| Spore Identification | Room C4 | Room C6 | Room C12 | Room T1 | Room T2 | Room T3 | Room T4 | Room T5 | Room T6 |
|---|---|---|---|---|---|---|---|---|---|
| Cladosporium | 11 | - | - | - | - | - | - | 11 | - |
| Ascospores | - | - | 11 | - | - | 11 | - | - | 22 |
| Basidiospores | - | - | 11 | - | - | - | 22 | - | - |
| Smuts, Periconia, Myxomycetes | - | - | - | - | - | - | - | - | - |
| Penicillium / Aspergillus Group | - | - | - | 58533 | 1424 | 22 | - | - | - |
| Alternaria | - | - | - | - | - | - | - | - | - |
| Drechslera / Bipolaris Group | - | - | - | - | - | - | - | - | - |
| Colorless | - | - | 22 | - | - | - | - | - | - |
| Curvularia | 11 | - | - | - | - | - | - | - | - |
| Stachybotrys | - | - | - | 327 | - | 11 | 242 | - | - |
| Unknown | - | - | 11 | - | - | - | 22 | 11 | - |
| Hyphal Elements | - | 11 | 11 | 654 | 89 | 22 | - | - | 22 |
| Torula Herbarum | - | - | - | - | - | - | - | - | - |
| Epicoccum | - | - | - | - | - | - | - | - | - |
| Pithomyces | - | - | - | - | - | - | - | - | - |
| Chaetomium | - | - | - | 3924 | 359 | - | - | - | - |
| Nigrospora | - | - | - | - | - | - | - | - | - |
| Trichoderma | - | - | - | 43491 | 9701 | - | - | - | - |
| Ulocladium | - | - | - | - | - | - | - | - | - |
| Spegazzinia | - | - | - | - | - | - | - | - | - |
| Algae | - | - | - | - | - | - | 44 | - | - |
| Clear Brown | - | - | - | - | - | - | - | - | - |
| **Totals** | 22 | 11 | 66 | 106929 | 11573 | 66 | 330 | 22 | 44 |



ALL RESULTS ARE LISTED AS NUMBER OF SPORES PER CUBIC METER OF AIR

## Table 7
## Results of Carpet Vacuum Samples - Direct Exam and Culture

| Sample No. | Location | Direct Exam Results | Culture Exam Results |
|---|---|---|---|
| 1 | Room C3, by entrance | Numerous Pollen Grains Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Alternaria Spores Seen<br>Occasional Curvularia Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 970,000 CFU / gram<br>Sterilia Mycelia - 63%<br>Cladosporium Species - 37%<br>Dust Mite Allergens <1.6 *u*g/g |
| 2 | Room C3, back of class, west side | Numerous Pollen Grains Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Ulocladium Spores Seen<br>Few Hyphal Elements Seen | 570,000 CFU / gram<br>Sterilia Mycelia - 71%<br>Cladosporium Species - 21%<br>Epicoccum Species - 8%<br>Dust Mite Allergens <1.6 *u*g/g |
| 3 | Room C1, by entrance | Few Ulocladium Spores Seen<br>Moderate Pollen Grains Seen<br>Occasional Basidiospores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen<br>Occasional Curvularia Spores Seen | 49,000 CFU / gram<br>Sterilia Mycelia - 80%<br>Cladosporium Species - 13%<br>Aspergillus Niger - 3% |
| 4 | Room C1, back area, center | Moderate Pollen Grains Seen<br>Occasional Curvularia Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Cladosporium Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 190,000 CFU / gram<br>Sterilia Mycelia - 89%<br>Cladosporium Species - 8%<br>Epicoccum Species - 3% |
| 5 | Room C2, by entrance | Numerous Pollen Grains Seen<br>Occasional Algae Cells Seen<br>Occasional Ulocladium Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 190,000 CFU / gram<br>Sterilia Mycelia - 85%<br>Cladosporium Species - 8%<br>Drechslera / Bipolaris Group - 7% |
| 6 | Room C2, back area, center | Numerous Pollen Grains Seen<br>Occasional Curvularia Spores Seen | 100,000 CFU / gram<br>Sterilia Mycelia - 94%<br>Cladosporium Species - 6% |
| 7 | Room C4, by entrance | Numerous Pollen Grains Seen<br>Occasional Hyphal Elements Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 30,000 CFU / gram<br>Sterilia Mycelia - 89%<br>Cladosporium Species - 11% |
| 8 | Room C4, back area, west center | Numerous Pollen Grains Seen<br>Occasional Ascospores Seen<br>Occasional Ulocladium Spores Seen<br>Occasional Hyphal Elements Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 730,000 CFU / gram<br>Sterilia Mycelia - 68%<br>Cladosporium Species - 21%<br>Epicoccum Species - 11% |



CFU = COLONY FORMING UNITS

## Table 7
## Results of Carpet Vacuum Samples - Direct Exam and Culture

| Sample No. | Location | Direct Exam Results | Culture Exam Results |
|---|---|---|---|
| 9 | Room C6, by entrance | Moderate Pollen Grains Seen<br>Occasional Algae Cells Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 72,000 CFU / gram<br>Sterilia Mycelia - 66%<br>Cladosporium Species - 22%<br>Epicoccum Species - 7% |
| 10 | Room C6, back area, center | Numerous Pollen Grains Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Hyphal Elements Seen<br>Occasional Basidiospores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 300,000 CFU / gram<br>Sterilia Mycelia - 63%<br>Cladosporium Species - 27%<br>Epicoccum Species - 5% |
| 11 | Room C12, by entrance | Numerous Pollen Grains Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Ulocladium Spores Seen<br>Occasional Curvularia Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 340,000 CFU / gram<br>Sterilia Mycelia - 68%<br>Cladosporium Species - 23%<br>Penicillium Species - 6% |
| 12 | Room C12, back area, center | Numerous Pollen Grains Seen<br>Occasional Hyphal Elements Seen<br>Occasional Basidiospores Seen<br>Occasional Cladosporium Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Pestalotiopsis Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 2,900,000 CFU / gram<br>Cladosporium Species - 53%<br>Sterilia Mycelia - 40%<br>Epicoccum Species - 5% |
| 13 | Room B6, by entrance | Moderate Pollen Grains Seen<br>Occasional Ascospores Seen<br>Occasional Curvularia Spores Seen<br>Occasional Colorless Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 190,000 CFU / gram<br>Cladosporium Species - 43%<br>Sterilia Mycelia - 43%<br>Epicoccum Species - 11%<br>Aspergillus Niger - 1%<br><br>Dust Mite Allergens <1.6 *ug/g* |
| 14 | Room B6, back area, east side | Numerous Pollen Grains Seen<br>Occasional Basidiospores Seen<br>Occasional Curvularia Spores Seen<br>Occasional Alternaria Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Pithomyces Spores Seen<br>Occasional Cladosporium Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 3,100,000 CFU / gram<br>Cladosporium Species - 87%<br>Sterilia Mycelia - 7%<br>Epicoccum Species - 4%<br>Dust Mite Allergens <1.6 *ug/g* |

## Table 7
## Results of Carpet Vacuum Samples - Direct Exam and Culture

| Sample No. | Location | Direct Exam Results | Culture Exam Results |
|---|---|---|---|
| 15 | Room B5, by entrance | Numerous Pollen Grains Seen<br>Occasional Rusts Seen<br>Occasional Ascospores Seen<br>Occasional Curvularia Spores Seen<br>Occasional Pithomyces Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 150,000 CFU / gram<br>Cladosporium Species - 53%<br>Sterilia Mycelia - 29%<br>Epicoccum Species - 17% |
| 16 | Room B5, back area, center | Numerous Pollen Grains Seen<br>Few Hyphal Elements Seen<br>Occasional Pithomyces Spores Seen<br>Occasional Curvularia Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 610,000 CFU / gram<br>Sterilia Mycelia - 62%<br>Cladosporium Species - 24%<br>Epicoccum Species - 12% |
| 17 | Room B8, by entrance | Numerous Pollen Grains Seen<br>Few Hyphal Elements Seen<br>Occasional Algae Cells Seen<br>Occasional Ulocladium Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 120,000 CFU / gram<br>Sterilia Mycelia - 51%<br>Cladosporium Species - 31%<br>Epicoccum Species - 14% |
| 18 | Room B8, back area, center | Moderate Pollen Grains Seen<br>Occasional Ascospores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 1,300,000 CFU / gram<br>Sterilia Mycelia - 49%<br>Cladosporium - 33%<br>Epicoccum - 18% |
| 19 | Room B12, by entrance | Numerous Pollen Grains Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 560,000 CFU / gram<br>Sterilia Mycelia - 58%<br>Cladosporium Species - 32%<br>Epicoccum Species - 6% |
| 20 | Room B12, back area, center | Moderate Pollen Grains Seen<br>Occasional Curvularia Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Cladosporium Spores Seen<br>Occasional Algae Cells Seen | 250,000 CFU / gram<br>Sterilia Mycelia - 48%<br>Cladosporium Species - 36%<br>Epicoccum Species - 12% |
| 21 | T2, Center | Numerous Pollen Grains Seen<br>Few Hyphal Elements Seen<br>Few Epicoccum Spores Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 250,000 CFU / gram<br>Sterilia Mycelia - 78%<br>Cladosporium Species - 11%<br>Epicoccum Species - 6% |



CFU = COLONY FORMING UNITS

## Table 7
## Results of Carpet Vacuum Samples - Direct Exam and Culture

| Sample No. | Location | Direct Exam Results | Culture Exam Results |
|---|---|---|---|
| 22 | T1 Center | Moderate Pollen Grains Seen<br>Occasional Algae Cells Seen<br>Occasional Hyphal Elements Seen<br>Few Epicoccum Spores Seen<br>Few Curvularia Spores Seen<br>Occasional Pithomyces Spores Seen | 130,000 CFU / gram<br>Sterilia Mycelia - 42%<br>Cladosporium Species - 39%<br>Epicoccum Species - 12% |
| 23 | T4 Center | Numerous Pollen Grains Seen<br>Occasional Cladosporium Spores Seen | 210,000 CFU / gram<br>Sterilia Mycelia - 67%<br>Cladosporium Species - 20%<br>Epicoccum species - 13% |
| 24 | T3 Center | Numerous Pollen Grains Seen<br>Occasional Curvularia Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Hyphal Elements Seen<br>Occasional Drechslera / Bipolaris Group Spores Seen | 550,000 CFU / gram<br>Cladosporium Species - 59%<br>Sterilia Mycelia - 24%<br>Epicoccum Species - 14% |
| 25 | T5 Center | Moderate Hyphal Elements Seen<br>Occasional Cladosporium Spores Seen<br>Occasional Drechslera Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Pithomyces Spores Seen<br>Moderate Pollen Grains Seen<br>Few Algae Cells Seen | 300,000 CFU / gram<br>Sterilia Mycelia - 46%<br>Epicoccum Species - 30%<br>Cladosporium Species - 21% |
| 26 | T6 Center | Few Pollen Grains Seen<br>Few Hyphal Elements Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Drechslera Spores Seen<br>Occasional Pithomyces / Ulocladium Group Spores Seen | 330,000 CFU / gram<br>Sterilia Mycelia - 47%<br>Cladosporium Species - 30%<br>Epicoccum Species - 21% |
| 27 | Room A4, by entrance | Moderate Pollen Grains Seen<br>Few Hyphal Elements Seen<br>Occasional Alternaria Spores Seen<br>Occasional Ascospores Seen<br>Occasional Curvularia Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Cladosporium Spores Seen<br>Occasional Drechslera Spores Seen | 160,000 CFU / gram<br>Cladosporium Species - 48%<br>Sterilia Mycelia - 41%<br>Epicoccum Species - 11% |
| 28 | Room A4, back area, center | Occasional Curvularia Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Drechslera Spores Seen<br>Few Hyphal Elements Seen | 440,000 CFU / gram<br>Cladosporium Species - 41%<br>Sterilia Mycelia - 37%<br>Epicoccum Species - 15% |



CFU = COLONY FORMING UNITS

## Table 7
## Results of Carpet Vacuum Samples - Direct Exam and Culture

| Sample No. | Location | Direct Exam Results | Culture Exam Results |
|---|---|---|---|
| 29 | Room A5, by entrance | Few Hyphal Elements Seen<br>Occasional Pithomyces Spores Seen<br>Occasional Cladosporium Spores Seen<br>Moderate Pollen Grains Seen | 310,000 CFU / gram<br>Sterilia Mycelia - 42%<br>Cladosporium Species - 40%<br>Epicoccum Species - 12% |
| 30 | Room A5, back area, center | Occasional Epicoccum Spores Seen<br>Few Hyphal Elements Seen | Sterilia Mycelia - 43%<br>Cladosporium Species - 43%<br>Rhodotorula Species - 7% |
| 31 | Room A7, by entrance | Few Hyphal Elements Seen<br>Occasional Ascospores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Curvularia Spores Seen<br>Occasional Algae Cells Seen | 220,000 CFU / gram<br>Sterilia Mycelia - 58%<br>Cladosporium Species - 31%<br>Epicoccum Species - 11% |
| 32 | Room A7, back area, center | Occasional Drechslera Spores Seen<br>Occasional Pithomyces Spores Seen<br>Few Hyphal Elements Seen<br>Few Epicoccum Spores Seen<br>Occasional Algae Cells Seen | 1,100,000 CFU / gram<br>Sterilia Mycelia - 45%<br>Cladosporium Species - 32%<br>Epicoccum Species - 23% |
| 33 | Room A8, by entrance | Moderate Pollen Grains Seen<br>Occasional Cladosporium Spores Seen<br>Occasional Pithomyces Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Curvularia Spores Seen<br>Few Hyphal Elements Seen | 770,000 CFU / gram<br>Sterilia Mycelia - 75%<br>Cladosporium Species - 20%<br>Epicoccum Species - 5% |
| 34 | Room A8, back area, center | Occasional Epicoccum Spores Seen<br>Few Hyphal Elements Seen<br>Few Pollen Grains Seen | 1,900,000 CFU / gram<br>Sterilia Mycelia - 53%<br>Cladosporium Species - 35%<br>Epicoccum Species - 12% |
| 35 | Room A10, by entrance | Moderate Pollen Grains Seen<br>Occasional Algae Cells Seen<br>Occasional Curvularia Spores Seen<br>Occasional Ascospores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Drechslera Spores Seen<br>Few Hyphal Elements Seen | 330,000 CFU / gram<br>Cladosporium Species - 41%<br>Sterilia Mycelia - 32%<br>Epicoccum Species - 17% |
| 36 | Room A10, back area, center | Large Amounts of Pollen Grains Seen<br>Occasional Curvularia Spores Seen<br>Occasional Drechslera Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Ulocladium Spores Seen<br>Occasional Tetraploa Spores Seen<br>Few Hyphal Elements Seen | 1,800,000 CFU / gram<br>Cladosporium Species - 57%<br>Sterilia Mycelia - 29%<br>Epicoccum Species - 14% |



CFU = COLONY FORMING UNITS

## Table 7
## Results of Carpet Vacuum Samples - Direct Exam and Culture

| Sample No. | Location | Direct Exam Results | Culture Exam Results |
|---|---|---|---|
| 37 | Room A11, by entrance | Moderate Pollen Grains Seen<br>Occasional Algae Cells Seen<br>Occasional Curvularia Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Drechslera Spores Seen<br>Few Hyphal Elements Seen | 130,000 CFU / gram<br>Sterilia Mycelia - 51%<br>Cladosporium Species - 36%<br>Epicoccum Species - 10% |
| 38 | Room A11, back area, center | Occasional Alternaria Spores Seen<br>Occasional Curvularia Spores Seen<br>Moderate Hyphal Elements Seen<br>Occasional Algae Cells Seen | 1,200,000 CFU / gram<br>Sterilia Mycelia - 46%<br>Cladosporium Species - 31%<br>Epicoccum Species - 8% |
| 39 | Room A13, by entrance | Moderate Pollen Grains Seen<br>Occasional Pithomyces Spores Seen<br>Occasional Curvularia Spores Seen<br>Occasional Epicoccum Spores Seen<br>Few Hyphal Elements Seen | 610,000 CFU / gram<br>Sterilia Mycelia - 69%<br>Cladosporium Species - 23%<br>Yeast - 8% |
| 40 | Room A13, back area, center | Occasional Pithomyces Spores Seen<br>Occasional Epicoccum Spores Seen<br>Occasional Alternaria Spores Seen<br>Few Hyphal Elements Seen | 370,000 CFU / gram<br>Sterilia Mycelia - 55%<br>Cladosporium Species - 25%<br>Epicoccum Species - 9% |
| 41 | Room A012, behind reception desk | Occasional Epicoccum Spores Seen<br>Few Pollen Grains Seen | 590,000 CFU / gram<br>Cladosporium Species - 47%<br>Sterilia Mycelia - 28%<br>Yeast - 14% |
| 42 | Room A012, at entrance to A013 | Moderate Pollen Grains Seen<br>Occasional Epicoccum Spores Seen<br>Few Hyphal Elements Seen | 580,000 CFU / gram<br>Sterilia Mycelia - 67%<br>Cladosporium Species - 23%<br>Epicoccum Species - 7% |



CFU = COLONY FORMING UNITS

## Table 8
## Results of Formaldehyde Samples

| Room and Location | Formaldehyde Concentration (ppm) |
|---|---|
| C3 Center | 0.029 |
| C3 Center, 11' High | 0.030 |
| C1 Center | 0.025 |
| C12 Center | <0.025 |
| B6 Back West | <0.025 |
| B6 Center, 11' High | <0.025 |
| B5 Center | <0.025 |
| B12 Back Center | <0.025 |
| A4 Center | <0.025 |
| A7 Center | <0.026 |
| A10 Center | <0.026 |
| A012 Reception | <0.026 |
| T1 Center | <0.026 |
| T4 Center | 0.026 |
| T6 Center | <0.026 |
| Outside | <0.026 |
| Media Center | 0.027 |

| Formaldehyde Exposure Standards (ppm) | | |
|---|---|---|
| ACGIH TLV | NIOSH REL | OSHA PEL |
| 0.3 Ceiling | 0.016 | 0.75 |

## Table 9
## Results of Wipe Samples of Belongings

| Sample No. | Location | Sample Description | Direct Exam Results | Sample Culture Results |
|---|---|---|---|---|
| 040202-01 | Room A10 | Scholastic red boxes, inside & out | Occasional Algae Seen<br>Moderate Pollen Seen<br>Occasional Curvularia Spores Seen | 1300 CFU / Plate<br>Yeast - 46%<br>Cladosporium Species - 31%<br>Epicoccum Species - 15% |
| 040202-02 | Room A10 | Brown cardboard box and gray books inside | Moderate Pollen Seen<br>Occasional Algae Seen<br>No Fungal Spores Seen | 1800 CFU / Plate<br>Sterilia Mycelia - 67%<br>Cladosporium Species - 17%<br>Epicoccum Species - 11% |
| 040202-03 | Room A10 | Brown cardboard box and contents, on floor next to door | Numerous Pollen Seen<br>Moderate Bacteria Seen<br>Occasional Cladosporium Spores Seen | 2300 CFU / Plate<br>Sterilia Mycelia - 48%<br>Cladosporium Species - 26%<br>Curvularia Species - 9% |
| 040202-04 | Room A10 | Pink "Signature" binders | Moderate Bacteria Seen<br>Numerous Pollen Seen<br>No Fungal Spores Seen | 1900 CFU / Plate<br>Cladosporium Species - 53%<br>Sterilia Mycelia - 26%<br>Epicoccum Species - 16% |
| 040202-05 | Room A10 | White Crate Contents | Moderate Pollen Seen<br>Occasional Hyphal Elements Seen<br>Occasional Curvularia Spores Seen<br>Occasional Drechslera/Bipolaris Spores Seen<br>Occasional Pestalotiopsis Spores Seen | 1200 CFU / Plate<br>Epicoccum Species - 33%<br>Yeast - 25%<br>Sterilia Mycelia - 25% |
| 040202-06 | Room A10 | Pink "Language Handbooks" on bookshelf | Occasional Smuts Seen<br>Occasional Hyphal Elements Seen<br>Occasional Pollen Seen<br>Occasional Ascospores Seen | 50 CFU / Plate<br>Sterilia Mycelia - 60%<br>Cladosporium Species - 40% |
| 040202-01 | Room A11 | Blue World Books | Numerous Bacteria Seen<br>Numerous Pollen Seen<br>Occasional Algae Seen<br>No Fungal Spores Seen | 6700 CFU / Plate<br>Yeast - 96%<br>Fusarium Species - 1%<br>Cladosporium Species - 1% |

BRITTIN E.S., FORT STEWART, GA

SAMPLES WERE FIRST ANALYZED BY DIRECT EXAM, THEN CULTURED
CFU = COLONY FORMING UNITS

## Table 9
## Results of Wipe Samples of Belongings

| Sample No. | Location | Sample Description | Direct Exam Results | Sample Culture Results |
|---|---|---|---|---|
| 040202-02 | Room A11 | "The World Past and Present" Books | Moderate Bacteria Seen<br>Numerous Pollen Grains Seen<br>Occasional Hyphal Elements Seen<br>No Fungal Spores Seen | 2000 CFU / Plate<br>Cladosporium Species - 50%<br>Rhodotorula Species - 20%<br>Epicoccum Species - 20% |
| 040202-03 | Room A11 | Contents of Gray Crate on Bookshelf | Occasional Ascospores Seen<br>Occasional Hyphal Elements Seen<br>Occasional Pollen Seen | 2300 CFU / Plate<br>Sterilia Mycelia - 43%<br>Epicoccum Species - 22%<br>Rhodotorula Species - 17% |
| 040202-04 | Room A11 | Large "Hands on Geography" Box on Top of Large Gray Shelf | Occasional Curvularia Spores Seen<br>Occasional Pollen Seen<br>Occasional Hyphal Elements Seen | 520 CFU / Plate<br>Sterilia Mycelia - 38%<br>Cladosporium Species - 29%<br>Epicoccum Species - 19% |
| 04202-05 | Room A11 | Vinyl Math Posters on Wall | Occasional Ascospores Seen | 210 CFU / Plate<br>Sterilia Mycelia - 62%<br>Epicoccum Species - 24%<br>Cladosporium Species - 14% |
| 040202-06 | Room A11 | Set of Paper "World Atlas" for Intermediate Students | Few Pollen Grains Seen<br>Occasional Cladosporium Spores Seen<br>Occasional Smuts Seen<br>Occasional Hyphal Elements Seen | 2700 CFU / Plate<br>Cladosporium Species - 37%<br>Epicoccum Species - 30%<br>Sterilia Mycelia - 26% |
| 040202-01 | Room A13 | Tops of Blue Tubs | Occasional Drechslera Spores Seen<br>Occasional Epicoccum Spores Seen<br>Numerous Bacteria Seen | 2300 CFU / Plate<br>Yeast - 57%<br>Sterilia Mycelia - 26%<br>Cladosporium Species - 13% |
| 040202-02 | Room A13 | "Discovery Works" Science Notebooks | Occasional Yeast Cells Seen<br>Occasional Pollen Seen | 5000 CFU / Plate<br>Yeast - 74%<br>Sterilia Mycelia - 10%<br>Cladosporium Species - 10%<br>Aspergillus Niger - 2% |
| 040202-03 | Room A13 | "Your Health" Books | Moderate Bacteria Seen<br>Few Pollen Grains Seen<br>No Fungal Spores Seen | 34,000 CFU / Plate<br>Yeast - 82%<br>Sterilia Mycelia - 9%<br>Cladosporium Species - 6% |

BRITTIN E.S., FORT STEWART, GA

SAMPLES WERE FIRST ANALYZED BY DIRECT EXAM, THEN CULTURED
CFU = COLONY FORMING UNITS

## Table 9
## Results of Wipe Samples of Belongings

| Sample No. | Location | Sample Description | Direct Exam Results | Sample Culture Results |
|---|---|---|---|---|
| 040202-04 | Room A13 | White Cart, Top Shelf, Paperback Books | Few Pollen Grains Seen<br>No Fungal Spores Seen | 1500 CFU / Plate<br>Sterilia Mycelia - 47%<br>Yeast - 40%<br>Geotrichum Species - 7% |
| 040202-05 | Room A13 | Old Newspapers Stacked In Back of Room | Occasional Drechslera Spores Seen<br>Occasional Hyphal Elements Seen<br>Occasional Pollen Seen | 900 CFU / Plate<br>Cladosporium Species - 44%<br>Sterilia Mycelia - 33%<br>Yeast - 22% |
| 040202-06 | Room A13 | Wooden Shelf Contents on Teachers Desk | Occasional Pollen Seen<br>No Fungal Spores Seen | 1800 CFU / Plate<br>Yeast - 61%<br>Sterilia Mycelia - 28%<br>Cladosporium Species - 11% |
| 04/0102-01 | Room C3 | Large Cardboard Box | Occasional Curvularia Spores Seen | 7 CFU / Square Inch<br>Curvularia Species - 50%<br>Yeast - 50% |
| 04/0102-02 | Room C3 | Cardboard Cow | Occasional Ascospores Seen | 3 CFU / Square Inch<br>Rhodotorula Species - 100% |
| 04/0102-03 | Room C3 | Papier Mache Violin | No Fungal Spores Seen | 24 CFU / Square Inch<br>Sterilia Mycelia - 50%<br>Trichoderma Species - 13%<br>Epicoccum Species - 13% |
| 04/0102-04 | Room C3 | Brown Box with Orange Edge | No Fungal Spores Seen | 50 CFU / Square Inch<br>Yeast - 67%<br>Sterilia Mycelia - 20%<br>Trichoderma Species - 7% |
| 04/0102-05 | Room C3 | Papier Mache Cake | Occasional Epicoccum Spores Seen | 110 CFU / Square Inch<br>Yeast - 82%<br>Sterilia Mycelia - 12%<br>Epicoccum Species - 3% |
| 1 | T6 | Large Blue Box #1 | No Fungal Spores Seen | 290 CFU / Plate<br>Penicillium Species - 34%<br>Sterilia Mycelia - 17%<br>Yeast - 21%<br>Fusarium Species - 10% |



SAMPLES WERE FIRST ANALYZED BY DIRECT EXAM, THEN CULTURED
CFU = COLONY FORMING UNITS

## Table 9
## Results of Wipe Samples of Belongings

| Sample No. | Location | Sample Description | Direct Exam Results | Sample Culture Results |
|---|---|---|---|---|
| 2 | T6 | Large Blue Box #2 | Occasional Pollen Seen<br>No Fungal Spores Seen | 270 CFU / Plate<br>Sterilia Mycelia - 41%<br>Cladosporium Species - 26%<br>Penicillium Species - 19% |
| 3 | T6 | Shoebox Library Boxes (2) | Numerous Colorless Spores Seen<br>Moderate Chaetomium Spores Seen<br>Few Hyphal Elements Seen<br>Few Pollen Grains Seen | 52,000 CFU / Plate<br>Penicillium Species - 52%<br>Cladosporium Species - 27%<br>Chaetomium Species - 21% |
| 4 | T6 | "Jumping Levels" Boxes | Few Colorless Spores Seen | 60 CFU / Plate<br>Sterilia Mycelia - 50%<br>Cladosporium Species - 17%<br>Penicillium Species - 17% |
| 5 | T6 | Baby Wipes Boxes | Occasional Curvularia Spores Seen<br>Occasional Pollen Seen<br>Occasional Hyphal Elements Seen | 2000 CFU / Plate<br>Sterilia Mycelia - 45%<br>Yeast - 40%<br>Penicillium Species - 10% |
| 6 | T6 | Books 3.0 - 3.9 | Occasional Pollen Seen<br>Few Colorless Spores Seen | 1100 CFU / Plate<br>Yeast - 36%<br>Chaetomium Species - 27%<br>Cladosporium Species - 27% |
| 040202-12 | A012 (Ms. Sharp) | Wipe of HVAC Diffuser | Numerous Bacteria Seen<br>Occasional Hyphal Elements Seen<br>No Fungal Spores Seen | 60 CFU / Plate<br>Sterilia Mycelia - 67%<br>Cladosporium Species - 33% |
| 040202-13 | A012 (Ms. Sharp) | Wipe of HVAC Diffuser | Occasional Cladosporium Spores Seen<br>Moderate Bacteria Seen<br>Occasional Hyphal Elements Seen | 60 CFU / Plate<br>Sterilia Mycelia - 67%<br>Yeast 17%<br>Cladosporium Species - 16% |



SAMPLES WERE FIRST ANALYZED BY DIRECT EXAM, THEN CULTURED
CFU = COLONY FORMING UNITS

ATTACHMENT

A

# *Aerobiology Laboratory Associates, Inc. Report*

AEROBIOLOGY LABORATORY
ASSOCIATES, INCORPORATED
MICROBIOLOGY SPECIALISTS

# INDOOR AIR QUALITY ASSESSMENT

**Brittin Elementary School**
**Fort Stewart, Georgia**

**Prepared for:**

**Michael Baker Corporation**
**420 Rouser Road**
**Airport Office Park, Bldg 3**
**Coraopolis, Pennsylvania 15108**

**April 25, 2002**

Prepared by:

Suzanne S. Blevins, B.S, SM(ASCP)
Laboratory Director
Aerobiology Laboratory Associates, Incorporated

AEROBIOLOGY LABORATORY
ASSOCIATES, INCORPORATED
MICROBIOLOGY SPECIALISTS

# INDOOR AIR QUALITY ASSESSMENT

**Brittin Elementary School**
**Fort Stewart, Georgia**

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# INDOOR AIR QUALITY ASSESSMENT

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**Fort Stewart, Georgia**

## 1.0 INTRODUCTION

Aerobiology Laboratory Associates, Incorporated was retained by Michael Baker Corporation on April 1, 2002, to conduct a microbial investigation to determine the levels of bacteria and fungi and identify the nature, sources and causes of levels of microbials at the Brittin Elementary School at Fort Stewart, Georgia. We were also asked to advise as to the contributing factors, in addition to any other circumstances or conditions that would affect the microbial levels. Finally, we were asked to provide recommendations for remediation.

## 2.0 SCOPE OF WORK

The consultation services and technical support of Aerobiology Laboratory Assoc. was supplemented by the technical expertise of Michael Baker Corporation. The survey of the Brittin Elementary School building and trailers evaluated materials, carpet dust, surface areas, and air for concentrations and types of fungi and bacteria. The analyses consisted of non-viable spore trap analysis to measure the total fungal spore concentration and types present in the air, viable bacteria and fungi cultures of air, surface, carpet dust, and bulk materials and direct readings of surface swabs, carpet dusts, and bulk materials for the presence of fungi. In summary, our review consisted of the following:

1. Site visit on Monday, April 1 and Tuesday, April 2, in the presence of Warren Lehew of Michael Baker Corporation and Bob Heffley from the Fort Stewart School System.

2. Collection of fungal and bacterial air cultures, surface, carpet dust, and bulk materials for fungal culture, total spore evaluation and direct read for fungi;

3. Laboratory Analysis of the samples;

4. Evaluation of Survey Results;

5. Review of Materials and Reports included in Tab 1

6. Recommendations and Conclusions

## 3.0 BACKGROUND

The Brittin Elementary School is located at Fort Stewart in Hinesville, Georgia. It consists of a main school building with six portable trailers positioned on concrete slabs. The school was built in 1981, has the original mechanical system, and carpeting that is approximately 10 – 12 years old.

The school hallways are covered with vinyl composite tile and the classrooms, trailers and general office areas are carpeted.

The HVAC units servicing each room do not have any outside air intakes and the return air is brought into the over the corridor plenum and mixed with the air on the other side of the corridor. The mixture of the two classrooms air is drawn through the heat pump and then sent back into the classrooms.

The classrooms were reported to allow outdoor air in through the fire exit windows found in the perimeter walls, until the September 11, 2001 attack, at which time this was prohibited.

The trailers are self contained, carpeted units, with window unit systems.

## 4.0 SAMPLES

Fungal and bacterial viable air cultures and spore trap samples were taken in the A Wing, B Wing, C Wing, all six trailers, Mrs. Lampin's and Mrs. Sharpe's offices which are in the administrative area of Wing A.

Bulk dust samples were taken for fungal culture and direct microscopic examination in the A Wing, B Wing, C Wing and all trailers.

Surface wipe samples for fungal culture and direct microscopic examination were collected from the contents of Rooms C-3, Room A-10, Room A-11 and Rooms A-13 and Trailer 6. Contents to be sampled were designated by the teachers who were moving these items the following week to Diamond School or to alternate classroom areas.

Surface wipe samples for fungal culture and direct microscopic examination were also collected from molding, drywall, and paneling in Trailers 1 and 2.

Tape samples were taken in Room B-8 under the sink, a soccer ball, and paneling in Trailer 6.

Bulk samples of insulation, paneling, drywall, wallpaper and plywood were taken for culture and direct microscopic examination from the trailers.

Dust mite samples were taken in Room C-3 and Room B-6.

## 5.0 SURVEY METHODOLOGY

Testing Methods

Spore results were collected using a Burkard Personal Spore Trap impactor. A spore is a dormant form from which fungi germinate when appropriate growth conditions are present. Spores are bodies that permit survival of a microorganism during unfavorable growth conditions (food source, temperature, and moisture). Spores can cause allergic reactions or other health problems in sensitive persons. Air is drawn through the suction-type slit volumetric impactor which has an internal pump pulling 10 lpm onto a slide prepared with an adhesive to capture the spores and fragments. Analysis was performed in accordance with the instrument instructions and spores were counted and characterized for each site sampled. Passive and active samples were taken

Viable air cultures were collected using a SAS (Surface Air System) impactor. This air is drawn through the impactor using an internal calibrated pump at the rate of 100 liters per minute. Malt extract agar and DG-18 agar are used for fungal samples and Tryptic Soy Agar is used for bacterial isolation. The agar and sampling protocols are discussed in the microbiological isolation and characterizations techniques

portion of the ACGIH "Bioaerosols: Assessment and Control". The samples were analyzed to identify the concentrations of viable fungi and bacteria present in colony forming units per cubic meter of air (cfu/m^3) and identify the fungi and bacterial isolated.

Bulk materials (carpet dust, insulation, drywall and paneling) were collected from the main school and the trailers and analyzed for fungal concentration and types. The material is weighed out in the laboratory, put into a sterile broth, and plated on the previously mentioned medias at multiple dilutions and incubated. The samples were analyzed to identify the concentrations of viable (able to grow on culture media in the laboratory) fungi present in colony forming units per gram (cfu/g) and to identify the fungi present. Colony forming units (cfu) is a descriptive acronym used in assessing the growth of microorganisms on pert dishes.

Wipe cultures are collected with a sterile swab system, and are used to collect surface organisms. Templates of varying areas are made and the swab is rolled over the area in question, collecting the organisms deposited or colonizing the material. In the laboratory, the swab is then put into one milliliter of sterile water and multiple dilutions are cultured on the appropriate medias and incubated. Media is the material in a petri dish that the actual fungi grow on, from which the count and identification of the organisms is made. The media is incubated or grown on the petri dish in a chamber with the appropriate temperature for the group of organisms that one is culturing. Calculations are made based on the dilution plate counted.

Direct microscopic readings for total fungi of materials were collected using a sterile swab. The swab is placed in a tube of sterile broth and is vortexed to remove all of the fungal elements. The broth is placed on a microscope slide and directly examined for the types and quantity of fungal spores and fungal fragments present. Direct microscopic examination does not determine the viability of the fungal spore.

Direct microscopic readings for total fungi of bulk material requires laboratory personnel removing suspect contaminated areas with tape and directly examining the tape under the microscope for fungal spores or placing the bulk material (carpet dust) directly into a sterile tube of water and examining the material directly under the microscope for fungal spores.

Dust mite samples are measured by immunoassay testing protocol by an accredited laboratory. An action levels of 2,000 ng/g of allergen may be considered the levels of dust mite group I (Der p I or Der f I) that identifies an environment which places a dust mite allergic patient at increased risk for symptoms.

## 6.0 LABORATORY ANALYSES

Laboratory analyses were done by Aerobiology Laboratories Associates, Incorporated, Reston, Virginia. Their findings are set out at Appendix A through Appendix E.

## 7.0 FINDINGS

The criteria used to evaluate the survey results include guidelines referenced by the American Conference of Governmental Industrial Hygienists (ACGIH), the Guidelines on Assessment and Remediation of Fungi in Indoor Environments from the New York City Department of Health and the U.S. EPA document, Mold Remediation in Schools and Commercial Buildings, University of Minnesota, Department of Environmental Health and Safety guidelines, the OSHA Technical Manual and the IICRC Standard S500 (Institute for the Inspection and Cleaning and Restoration Clearance Standard).

Bacterial and Fungal Air Sample Results

Representative areas of Wing A, Wing B, Wing C and all of the trailers were tested for concentration and types of airborne bacteria. Bacteria are extremely small (0.4 – 10 microns), single-cell microscopic organisms. They are the most numerous organisms on earth and are formed everywhere, especially in soil. Because they are microscopic, they are easily airborne, and they are carried in water as well. Certain types of bacteria are inherent to particular environments, i.e., water bacteria, soil bacteria, human-commensal bacteria, pathogenic bacteria, and many more distinct niches.

Bacterial testing was performed in the classrooms where classes were being relocated due to complaints in addition to control rooms. Air samples were taken in all of the kindergarten rooms. Room C-3 is a complaint room and C-12 was used as a C Wing control room. Room B-6 is a complaint room and B-12 is the control room. Rooms A-10, A-11, and A-13 were complaint rooms, and Rooms A-4 and A-5 were used as control rooms. All of the trailers were sampled for airborne bacteria. The types and concentration of bacteria found during the sampling event of April 1 and April 2 do not indicate elevated levels of bacteria, nor do they show indicator types of bacteria typically associated with indoor air quality complaints or water related issues. All of the bacteria recovered from the air in all of the classrooms and trailers are those associated with human activity, such as *Coagulase-negative Staphylococcus, Micrococcus species, Corynebacterium species* or those introduced from outdoor reservoirs, i.e., *Bacillus species, Streptomyces species* and non-fermentative gram-negative rods, which are typically found in soil. The concentrations are very low for an elementary school. Of note is that there was no activity in the school for three days prior to testing which would result in slightly lower airborne levels. The consistent absence of gram-negative rods indicates that there are no current wet reservoirs in the occupied spaces within the school or trailers that could support elevated levels of bacterial growth. Gram-negative rods are a category of organisms widely distributed on plants and in soil, water, and the intestines of humans and animals. Some species occupy very limited ecological niches. Non-fermentative gram-negative rods are a group of environmental organisms within the larger category of gram-negative rods, found in water and soil and on plants, including fruits and vegetation. They are distributed worldwide.

The same areas were sampled for airborne types and concentrations of fungi. Fungi are primitive plants that lack chlorophyll and therefore must live as parasites or feed on organic matter that they digest externally and absorb. True fungi include yeast, mold, mildew, rust, smut and mushrooms. They are commonly associated with high moisture levels that can be the result of water coming in from the outside, through floors, walls or roof; plumbing leaks; or even moisture produced by people through daily activities. Moisture can accumulate when there is not enough ventilation to expel that moisture.

The viable fungal results for air samples taken in the C Wing and the B Wing do not indicate elevated levels. The types and concentrations found in all rooms sampled reflect the types and concentrations found in the outdoor sample taken on the same day.

The viable fungal results taken for air samples taken in the trailers indicate the repeated presence of several *Aspergillus* and *Penicillium* species, although in low levels. These organisms were not present in the outdoor sample taken on the same day.

The viable fungal results for air samples taken in the A Wing indicate the repeated presence of several indicator molds related to indoor air quality issues. *Stachybotrys, Chaetomium, Aspergillus* (multiple species) and *Trichoderma* were found in all seven of the classrooms tested. The levels, however, were low and ranged from 14 colony forming units per cubic meter of air to 91 colony forming units per cubic

meter of air. The control rooms of A-5, A-7, and A-8 also indicate the presence of *Stachybotrys,* multiple *Aspergillus species,* and *Tricoderma species* in low concentration.

Spore Trap Results

The spore trap results taken by the Burkard Personal Spore Trap are used to support the viable fungal results. Spore trap samples were taken in all locations where viable fungal samples were taken. Results of spore trap analysis from Wings A, B, and C do not indicate elevated levels of total spore concentration nor do they identify areas that contain "indicator" spores, i.e., *Stachybotrys, Chaetomium* or *Penicillium/Aspergillus* group spores.

The spore trap results for trailers, however, do indicate very high levels of *Stachybotrys, Chaetomium, Trichoderma* and *Penicillium/Aspergillus* group spores.

Bulk Dust Sample Results

Carpet dust samples were collected for direct microscopic examination and fungal culture in Wing A, Wing B, Wing C, and the trailers.

Results from Wing A range from 130,000 cfu/g to 1.9 x 10^6 cfu/g in Room A-8. Results from Wing B range from 120,000 cfu/g to 3.1 x 10^6 cfu/g in Room B-6. Results from Wing C range from 30,000 cfu/g to 2.9 x 10^6 cfu/g in Room C12. Results from the trailer range from 130,000 cfu/g to 550,000 cfu/g.

The carpet in Brittin Elementary School is approximately 10 –12 years old. The levels found range from what is considered "low" to what is considered "high". The majority of the organisms found in the carpet dust are comprised of agricultural type spores; not those that are indicators of water events. They can be allergenic in nature and that is dependent on the immune status of the occupants. Often levels can accumulate to these numbers based on housekeeping practices in place, the type of activity in the area (classrooms, library), or the age of the carpet . What is noted, however, is that the levels are consistently higher in the back or center of the classroom, as opposed to the front or entrance of the classroom. The housekeeping staff may vacuum the entrance into the classroom more aggressively because of the obvious level of dirt tracked in from outside.

The OSHA Technical Manual states "Contamination Indicators: 1,000,000 fungi per gram of dust or material. The University of Minnesota guidelines state that "Microbial fungus levels more than 100,000 cfu/g has the potential of significantly contributing to airborne populations. Certain organisms like *Aspergillus, Penicillium* and *Stachybotrys* need attention at relatively low concentrations. Levels above 5000 cfu/g when *Aspergillus, Penicillium* and *Alternaria* are the predominate organisms is of concern.

Trailer Wipes and Bulks

All of the wipe and bulk direct and culture samples taken from all six of the trailers indicate high concentrations of mold and the presence of *Stachybotrys, Chaetomium, Trichoderma,* multiple *Aspergillus species, Penicillium, Fusarium* and yeast. The mold is visible, actively growing on multiple types of building materials in all of the trailers.

Surface Wipe Samples

Surface wipe samples were taken in Rooms C-3, Room A-10, Room A-11, Room A-13, and Trailer 6. These wipes were taken from surfaces of materials that was leaving that particular classroom and going to a new teaching site. The concern was that they would be contaminating the new site. The results from all four classrooms material indicate that the contents to be moved does not contain elevated levels of "indicator" spores. It does contain levels of agricultural and typical indoor spores that have been a result of deposition from activity of the HVAC system and activity going on in the classroom and housekeeping practices. These organisms at any level may be considered allergenic to those persons with document allergies.

Dust Mite Results

The entrance and back of Classroom C-3 and Room B-6 were sampled for dust mite allergens. All results came back below the detections limit of the test, indicating that there is not an elevated level of dust mite allergens present in these two rooms.

## 8.0 SUMMARY

There does not appear to be a bacterial or dust mite related indoor air quality issue in any area of Brittin Elementary School sampled.

The viable airborne fungal results show typical indoor levels and types of fungi in Wing B and Wing C. The fungi found inside reflect the fungi found in the outdoor control. There is no evidence of airborne fungal amplification in these wings.

The viable airborne fungal results for Wing A indicate repeated low levels of *Stachybotrys, Chaetomium,* and mixed *Aspergillus species.* The control rooms also demonstrated low levels of *Stachybotrys, Chaetomium, Tricoderma,* and multiple *Aspergillus species.* The sixth grade students in this wing rotate in and out of the trailers. There does not appear to be a reservoir in any of these classrooms. It is more than likely that the indicator organisms have been carried into the sixth grade classes on the students clothing, school related items, and personal items. The presence of the indicator organisms in the non-complaint or control rooms in Wing A simply show how spores are dispersed from affected areas to nearby non-affected area through mechanical systems or by occupants.

The spore traps taken in Wings A, B, and C do not show elevated levels of fungal spores present in the air. The spores identified reflect that of the outdoor environment and are of agriculture origin.

All six trailers have visible reservoirs of mold. The viable airborne cultures, the spore traps, the bulk materials and wipes all show elevated levels of potential mycotoxigenic and allergenic molds.

The carpet dust samples indicate a range of fungal concentrations. The numbers range from 30,000 cfu/g to 3.1 x 10^6 per gram in all three of the wings. There in no concentration of "indicator" mycotoxigenic fungi present, but *Cladosporium,* which can be allergenic, is present in most of the samples at significant concentrations. There is the potential exposure issue for allergenic and asthmatic occupants. Refer to the University of Minnesota document for guidelines for dust levels.

Dust mite results for Room C-3 (two locations) and Room B-6 were negative.

Wipe samples taken from the contents of Room C-3, Room A-10, Room A-11, Room A-13, and Trailer 6 indicated levels of typical indoor and outdoor spores that were deposited on the material. There was no evidence of amplification on these materials, and moving the contents off-site would not be a problem.

## 9.0 RECOMMEDATIONS

Based on the site visit observations and analyses results and findings discussed earlier, the following recommendations are made.

The trailers should not be used for classrooms or any other function. Non-porous materials may be removed after cleaning by trained individuals with appropriate personal protection. Porous material should be disposed of. If porous material must be recovered, hepa vacuum material, wipe down, dry and hepa vacuum one more time. Resample with same sampling protocol. The presence of any amount of the indicator organisms, i.e. *Aspergillus, Penicillium, Stachybotrys, Chaetomium, Tricoderma,* or *Fusarium* would prohibit the further use of the material, until additional cleaning follows.

The contents of the sixth grade and kindergarten classrooms that are relocating can be cleaned by HEPA vacuuming and wiping down with a mild detergent.

The carpet is a reservoir for multiple types of allergens. The levels are due to the age of the carpet, the type of activity, i.e., a classroom, the allergen loading caused by the lack of fresh air , recirculation of return air and the geographic area that has high fungal concentrations most of the year. All these contribute to the types and concentrations found. It is recommended that the carpet in the classrooms be removed and replace with vinyl composite tile. The allergenic load of the carpet is such that the carpet should be HEPA vacuumed before removal. After vacuuming, then the contractor can remove the carpet. The carpet should be wet for dust control and removed in small sections. The carpet should be bagged and taken of-site. Carpet adhesive should be removed and the room remain undisturbed for one day. The following day HEPA vacuum the floor. This should remove the majority of the spore load under the carpet and those previously airborne now settled on the flooring surface. This removal can be performed by general contract employees wearing a N-95 mask

After the mechanical system is replaced, ceilings and vinyl tile installed and the painting is completed in each wing, a general housekeeping cleaning should follow, including any external HVAC equipment components. Following the cleaning, spore traps should be collected in Wing B and Wing C and submitted to the laboratory with a 24 hour turn-around-time request. Viable fungal cultures and spore traps should be taken in Wing A to screen for *Aspergillus* and *Stachybotrys* previously recovered in this area. Upon completion of the renovation and installation of the new HVAC , a similar survey should be done following the April sampling event protocols and locations. This will demonstrate the absence of a fungal reservoirs and the condition of the area before re-occupancy.

Clearance or acceptable levels will be determined by the types and levels of viable fungi and fungal spores present in the outside versus those found in the inside air.

# APPENDIX A

AEROBIOLOGY LABORATORY
ASSOCIATES, INCORPORATED
MICROBIOLOGY SPECIALISTS

# Certificate of Laboratory Analysis

**Michael Baker Corp.**
**420 Rouser Rd. Airport Office Park Bldg 3**
**Corapolis, PA 15108**
**Attn:**
**Project: Brittin E. S.**

**Date Received:** 4/3/02
**Date Reported:** 4/8/02
**Page 1 of 8**
**Job ID:** 02 1903

| | | | |
|---|---|---|---|
| **Client Sample Number:** | C3 FRONT | **Lab Sample Number:** | 02 1903-01 |
| **Sampling Location:** | Room C3-Front Of Room, East Side | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | **28 cfu/m³** | |
| BACTERIA Isolated: | Bacillus species | 50% |
| | Micrococcus species | 25% |
| | Streptomyces species | 25% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **110 cfu/m³** | |
| FUNGUS Isolated: | Cladosporium species | 75% |
| | Sterilia mycelia | 19% |
| | Alternaria species | 6% |
| **Detection Limits:** | **7 cfu/m³** | |
| **Date Analyzed:** | 4/8/02 | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | |

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**420 Rouser Rd. Airport Office Park Bldg 3**
**Corapolis, PA 15108**
**Attn:**
**Project: Brittin E. S.**

**Date Received:** 4/3/02
**Date Reported:** 4/8/02

**Job ID:** 02 1903

| | | | |
|---|---|---|---|
| **Client Sample Number:** | C3 BACK | **Lab Sample Number:** | 02 1903-02 |
| **Sampling Location:** | Room C3-Back Of Room, Center | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |
| **TEST REQUESTED:** | 1005 AIR, Total BACTERIAL Count w/Identifications<br>1030 AIR, Total FUNGAL Count w/Identifications | | |
| Total BACTERIAL Count: | **21 cfu/m³** | | |
| BACTERIA Isolated: | Bacillus species | | 34% |
| | Coag-negative Staphylococcus species | | 33% |
| | Micrococcus species | | 33% |
| **Date Analyzed:** | 4/5/02 | | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | | |
| Total FUNGAL Count: | **150 cfu/m³** | | |
| FUNGUS Isolated: | Cladosporium species | | 90% |
| | Sterilia mycelia | | 5% |
| | Trichoderma species | | 5% |
| **Detection Limits:** | **7 cfu/m³** | | |
| **Date Analyzed:** | 4/8/02 | | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | | |

AEROBIOLOGY LABORATORY
ASSOCIATES, INCORPORATED
MICROBIOLOGY SPECIALISTS

# Certificate of Laboratory Analysis

**Michael Baker Corp.**
**420 Rouser Rd. Airport Office Park Bldg 3**
**Corapolis, PA 15108**
**Attn:**
**Project: Brittin E. S.**

**Date Received:** 4/3/02
**Date Reported:** 4/8/02
**Page 3 of 8**
**Job ID:** 02 1903

| | | | |
|---|---|---|---|
| **Client Sample Number:** | C1 FRONT | **Lab Sample Number:** | 02 1903-03 |
| **Sampling Location:** | Room C1-Front Of Room, East Side | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |
| **TEST REQUESTED:** | 1005 AIR, Total BACTERIAL Count w/Identifications<br>1030 AIR, Total FUNGAL Count w/Identifications | | |
| Total BACTERIAL Count: | **7 cfu/m³** | | |
| BACTERIA Isolated: | Bacillus species | | 100% |
| **Date Analyzed:** | 4/5/02 | | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | | |
| Total FUNGAL Count: | **380 cfu/m³** | | |
| FUNGUS Isolated: | Cladosporium species | | 92% |
| | Sterilia mycelia | | 4% |
| | Aspergillus species | | 4% |
| **Detection Limits:** | **7 cfu/m³** | | |
| **Date Analyzed:** | 4/8/02 | | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | C1 BACK | **Lab Sample Number:** | 02 1903-04 |
| **Sampling Location:** | Room C1-Back Of Room, Center | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | **36 cfu/m³** | |
| BACTERIA Isolated: | Bacillus species | 40% |
| | Coag-negative Staphylococcus species | 20% |
| | Micrococcus species | 20% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **240 cfu/m³** | |
| FUNGUS Isolated: | Cladosporium species | 88% |
| | Sterilia mycelia | 12% |
| **Detection Limits:** | **7 cfu/m³** | |
| **Date Analyzed:** | 4/8/02 | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | C2 | **Lab Sample Number:** | 02 1903-05 |
| **Sampling Location:** | Room C2 | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | **50 cfu/m³** | |
| BACTERIA Isolated: | Bacillus species | 71% |
| | Coag-negative Staphylococcus species | 29% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **420 cfu/m³** | |
| FUNGUS Isolated: | Cladosporium species | 92% |
| | Sterilia mycelia | 6% |
| | Epicoccum species | 2% |
| **Detection Limits:** | **7 cfu/m³** | |
| **Date Analyzed:** | 4/8/02 | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | C4 | **Lab Sample Number:** | 02 1903-06 |
| **Sampling Location:** | Room C4 | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | **7 cfu/m³** | |
| BACTERIA Isolated: | Coag-negative Staphylococcus species | 100% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **99 cfu/m³** | |
| FUNGUS Isolated: | Cladosporium species | 71% |
| | Sterilia mycelia | 21% |
| | Penicillium species | 8% |
| **Detection Limits:** | **7 cfu/m³** | |
| **Date Analyzed:** | 4/8/02 | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | C6 | **Lab Sample Number:** | 02 1903-07 |
| **Sampling Location:** | Room C6 | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

| | | |
|---|---|---|
| **TEST REQUESTED:** | 1005 AIR, Total BACTERIAL Count w/Identifications<br>1030 AIR, Total FUNGAL Count w/Identifications | |
| Total BACTERIAL Count: | **21 cfu/m³** | |
| BACTERIA Isolated: | Bacillus species | 67% |
| | Micrococcus species | 33% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **78 cfu/m³** | |
| FUNGUS Isolated: | Cladosporium species | 73% |
| | Sterilia mycelia | 18% |
| | Phialomonium-like species | 9% |
| **Detection Limits:** | **7 cfu/m³** | |
| **Date Analyzed:** | 4/8/02 | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | C12 | **Lab Sample Number:** | 02 1903-08 |
| **Sampling Location:** | Room C12-Control | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

Total BACTERIAL Count: **50 cfu/m³**

| BACTERIA Isolated: | | |
|---|---|---|
| | Bacillus species | 57% |
| | Coag-negative Staphylococcus species | 29% |
| | Streptomyces species | 14% |

**Date Analyzed:** 4/5/02

**Analyst:** Kay Frick, B.S., MT (ASCP)

Total FUNGAL Count: **180 cfu/m³**

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 84% |
| | Sterilia mycelia | 12% |
| | Penicillium species | 4% |

**Detection Limits:** **7 cfu/m³**

**Date Analyzed:** 4/8/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-1 | **Lab Sample Number:** | 02 1904-01 |
| **Sampling Location:** | Room B6-Front "Mrs. Cothran" Room | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | 141 L |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | 28 cfu/m³ | |
| BACTERIA Isolated: | Bacillus species | 75% |
| | Coag-negative Staphylococcus species | 25% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | 120 cfu/m³ | |
| FUNGUS Isolated: | Cladosporium species | 59% |
| | Sterilia mycelia | 35% |
| | Epicoccum species | 6% |
| **Detection Limits:** | 7 cfu/m³ | |
| **Date Analyzed:** | 4/8/02 | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-2 | **Lab Sample Number:** | 02 1904-02 |
| **Sampling Location:** | Room B6-Back "Mrs. Cothran" Room | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | **36 cfu/m³** | |
| BACTERIA Isolated: | Bacillus species | 80% |
| | Non-fermentative gram neg. rod | 20% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **110 cfu/m³** | |
| FUNGUS Isolated: | Cladosporium species | 75% |
| | Sterilia mycelia | 25% |
| **Detection Limits:** | **7 cfu/m³** | |
| **Date Analyzed:** | 4/8/02 | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-3 | **Lab Sample Number:** | 02 1904-03 |
| **Sampling Location:** | Room B5 | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | **43 cfu/m³** | |
| BACTERIA Isolated: | Bacillus species | 67% |
| | Micrococcus species | 17% |
| | Streptomyces species | 16% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **110 cfu/m³** | |
| FUNGUS Isolated: | Cladosporium species | 60% |
| | Sterilia mycelia | 33% |
| | Penicillium species | 7% |
| **Detection Limits:** | **7 cfu/m³** | |
| **Date Analyzed:** | 4/8/02 | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-4 | **Lab Sample Number:** | 02 1904-04 |
| **Sampling Location:** | Room B8 | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

Total BACTERIAL Count: **28 cfu/m³**

| BACTERIA Isolated: | | |
|---|---|---|
| | Coag-negative Staphylococcus species | 25% |
| | Micrococcus species | 25% |
| | Bacillus species | 25% |

**Date Analyzed:** 4/5/02

**Analyst:** Kay Frick, B.S., MT (ASCP)

Total FUNGAL Count: **92 cfu/m³**

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 38% |
| | Sterilia mycelia | 38% |
| | Penicillium species | 8% |

**Detection Limits:** **7 cfu/m³**

**Date Analyzed:** 4/8/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-5 | **Lab Sample Number:** | 02 1904-05 |
| **Sampling Location:** | Room B12-Non Complaint | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

Total BACTERIAL Count: **43 cfu/m³**

| BACTERIA Isolated: | | |
|---|---|---|
| | Bacillus species | 66% |
| | Non-fermentative gram neg. rod | 17% |
| | Streptomyces species | 17% |

**Date Analyzed:** 4/5/02

**Analyst:** Kay Frick, B.S., MT (ASCP)

Total FUNGAL Count: **160 cfu/m³**

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 68% |
| | Sterilia mycelia | 14% |
| | Penicillium species | 9% |

**Detection Limits:** **7 cfu/m³**

**Date Analyzed:** 4/8/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-6 | **Lab Sample Number:** | 02 1904-06 |
| **Sampling Location:** | Outdoor Control | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |
| **TEST REQUESTED:** | 1005 AIR, Total BACTERIAL Count w/Identifications<br>1030 AIR, Total FUNGAL Count w/Identifications | | |
| Total BACTERIAL Count: | **No Growth** | | |
| **Date Analyzed:** | 4/5/02 | | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | | |
| Total FUNGAL Count: | **330 cfu/m³** | | |
| FUNGUS Isolated: | Cladosporium species | | 85% |
| | Sterilia mycelia | | 15% |
| **Detection Limits:** | **7 cfu/m³** | | |
| **Date Analyzed:** | 4/8/02 | | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-7 | **Lab Sample Number:** | 02 1904-07 |
| **Sampling Location:** | Trailer T1 | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | 141 L |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

Total BACTERIAL Count: **No Growth**

**Date Analyzed:** 4/5/02

**Analyst:** Kay Frick, B.S., MT (ASCP)

Total FUNGAL Count: **64 cfu/m³**

| FUNGUS Isolated: | | |
|---|---|---|
| | Aspergillus terreus | 44% |
| | Aspergillus ustus | 44% |
| | Paecilomyces species | 12% |

**Detection Limits:** **7 cfu/m³**

**Date Analyzed:** 4/8/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-8 | **Lab Sample Number:** | 02 1904-08 |
| **Sampling Location:** | Trailer T2 | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |
| **TEST REQUESTED:** | 1005 AIR, Total BACTERIAL Count w/Identifications<br>1030 AIR, Total FUNGAL Count w/Identifications | | |
| Total BACTERIAL Count: | **21 cfu/m³** | | |
| BACTERIA Isolated: | Bacillus species | | 100% |
| **Date Analyzed:** | 4/5/02 | | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | | |
| Total FUNGAL Count: | **190 cfu/m³** | | |
| FUNGUS Isolated: | Cladosporium species | | 42% |
| | Aspergillus terreus | | 12% |
| | Penicillium species | | 12% |
| | Aspergillus ustus | | 4% |
| **Detection Limits:** | **7 cfu/m³** | | |
| **Date Analyzed:** | 4/8/02 | | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-9 | **Lab Sample Number:** | 02 1904-09 |
| **Sampling Location:** | Trailer T3 | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | 141 L |
| **TEST REQUESTED:** | 1005 AIR, Total BACTERIAL Count w/Identifications<br>1030 AIR, Total FUNGAL Count w/Identifications | | |
| Total BACTERIAL Count: | 43 cfu/m³ | | |
| BACTERIA Isolated: | Bacillus species | | 100% |
| **Date Analyzed:** | 4/5/02 | | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | | |
| Total FUNGAL Count: | 220 cfu/m³ | | |
| FUNGUS Isolated: | Sterilia mycelia | | 66% |
| | Cladosporium species | | 21% |
| | Aspergillus ustus | | 7% |
| **Detection Limits:** | 7 cfu/m³ | | |
| **Date Analyzed:** | 4/9/02 | | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-10 | **Lab Sample Number:** | 02 1904-10 |
| **Sampling Location:** | Trailer T4 | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

Total BACTERIAL Count: **50 cfu/m³**

| BACTERIA Isolated: | | |
|---|---|---|
| | Bacillus species | 58% |
| | Coag-negative Staphylococcus species | 14% |
| | Micrococcus species | 14% |

**Date Analyzed:** 4/5/02

**Analyst:** Kay Frick, B.S., MT (ASCP)

Total FUNGAL Count: **78 cfu/m³**

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 55% |
| | Aspergillus versicolor | 18% |
| | Penicillium species | 18% |

**Detection Limits:** **7 cfu/m³**

**Date Analyzed:** 4/8/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-11 | **Lab Sample Number:** | 02 1904-11 |
| **Sampling Location:** | Trailer T5 | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

Total BACTERIAL Count: **43 cfu/m³**

| BACTERIA Isolated: | | |
|---|---|---|
| | Bacillus species | 50% |
| | Coag-negative Staphylococcus species | 17% |
| | Streptomyces species | 17% |

**Date Analyzed:** 4/5/02

**Analyst:** Kay Frick, B.S., MT (ASCP)

Total FUNGAL Count: **160 cfu/m³**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 62% |
| | Cladosporium species | 24% |
| | Penicillium species | 10% |

**Detection Limits:** **7 cfu/m³**

**Date Analyzed:** 4/8/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-12 | **Lab Sample Number:** | 02 1904-12 |
| **Sampling Location:** | Trailer T6 | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | **160 cfu/m³** | |
| BACTERIA Isolated: | Streptomyces species | 86% |
| | Bacillus species | 14% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **110 cfu/m³** | |
| FUNGUS Isolated: | Cladosporium species | 48% |
| | Sterilia mycelia | 40% |
| | Penicillium species | 13% |
| **Detection Limits:** | **7 cfu/m³** | |
| **Date Analyzed:** | 4/8/02 | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | |

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**Attn:**
**Project: Britten E. S.**

**Date Received:** 4/3/02
**Date Reported:** 4/9/02

**Job ID:** 02 1904

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102-13 | **Lab Sample Number:** | 02 1904-13 |
| **Sampling Location:** | Blank | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **0 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

Total BACTERIAL Count: **No Growth**

**Date Analyzed:** 4/5/02

**Analyst:** Kay Frick, B.S., MT (ASCP)

Total FUNGAL Count: **No Growth**

**Detection Limits:** **7 cfu/m$^3$**

**Date Analyzed:** 4/8/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Attn:**
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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1905

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-01 | **Lab Sample Number:** | 02 1905-01 |
| **Sampling Location:** | Room 4A | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | **50 cfu/m³** | |
| BACTERIA Isolated: | Bacillus species | 86% |
| | Streptomyces species | 14% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **92 cfu/m³** | |
| FUNGUS Isolated: | Penicillium species | 38% |
| | Cladosporium species | 31% |
| | Aspergillus ustus | 31% |
| **Detection Limits:** | **7 cfu/m³** | |
| **Date Analyzed:** | 4/9/02 | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-02 | **Lab Sample Number:** | 02 1905-02 |
| **Sampling Location:** | Room 5A | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | **14 cfu/m³** | |
| BACTERIA Isolated: | Streptomyces species | 100% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **85 cfu/m³** | |
| FUNGUS Isolated: | Stachybotrys chartarum (atra) | 42% |
| | Chaetomium species | 33% |
| | Fusarium species | 8% |
| | Aspergillus sydowii | 8% |
| **Detection Limits:** | **7 cfu/m³** | |
| **Date Analyzed:** | 4/9/02 | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-03 | **Lab Sample Number:** | 02 1905-03 |
| **Sampling Location:** | Room 7A - Control | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | **7 cfu/m³** | |
| BACTERIA Isolated: | Bacillus species | 100% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **64 cfu/m³** | |
| FUNGUS Isolated: | Stachybotrys chartarum (atra) | 22% |
| | Aspergillus ustus | 22% |
| | Trichoderma species | 22% |
| | Aspergillus sydowii | 11% |
| **Detection Limits:** | **7 cfu/m³** | |
| **Date Analyzed:** | 4/9/02 | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-04 | **Lab Sample Number:** | 02 1905-04 |
| **Sampling Location:** | Room 8A | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

Total BACTERIAL Count: **No Growth**

**Date Analyzed:** 4/5/02

**Analyst:** Kay Frick, B.S., MT (ASCP)

Total FUNGAL Count: **14 cfu/m$^3$**

FUNGUS Isolated: Stachybotrys chartarum (atra) 100%

**Detection Limits:** **7 cfu/m$^3$**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-05 | **Lab Sample Number:** | 02 1905-05 |
| **Sampling Location:** | Room 10A | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | **141 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

Total BACTERIAL Count: **No Growth**

**Date Analyzed:** 4/5/02

**Analyst:** Kay Frick, B.S., MT (ASCP)

Total FUNGAL Count: **71 cfu/m³**

| | | |
|---|---|---|
| FUNGUS Isolated: | Cladosporium species | 50% |
| | Yeast (mixed species) | 20% |
| | Sterilia mycelia | 20% |
| | Stachybotrys chartarum (atra) | 10% |

**Detection Limits:** **7 cfu/m³**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-06 | **Lab Sample Number:** | 02 1905-06 |
| **Sampling Location:** | Room 11A | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | **141 L** |
| **TEST REQUESTED:** | 1005 AIR, Total BACTERIAL Count w/Identifications<br>1030 AIR, Total FUNGAL Count w/Identifications | | |
| Total BACTERIAL Count: | **21 cfu/m³** | | |
| BACTERIA Isolated: | Bacillus species | | 100% |
| **Date Analyzed:** | 4/5/02 | | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | | |
| Total FUNGAL Count: | **28 cfu/m³** | | |
| FUNGUS Isolated: | Aspergillus sydowii | | 50% |
| | Stachybotrys chartarum (atra) | | 25% |
| | Sterilia mycelia | | 25% |
| **Detection Limits:** | **7 cfu/m³** | | |
| **Date Analyzed:** | 4/9/02 | | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | | |

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**Client Sample Number:** 040202-07 **Lab Sample Number:** 02 1905-07
**Sampling Location:** Room 13A
**Date Collected:** 4/2/02 **Volume/Area:** 141 L

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

Total BACTERIAL Count: **No Growth**

**Date Analyzed:** 4/5/02

**Analyst:** Kay Frick, B.S., MT (ASCP)

Total FUNGAL Count: **50 cfu/m³**

| FUNGUS Isolated: | | |
|---|---|---|
| | Aspergillus sydowii | 29% |
| | Stachybotrys chartarum (atra) | 29% |
| | Chaetomium species | 14% |

**Detection Limits:** **7 cfu/m³**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

---

**Client Sample Number:** 040202-08 **Lab Sample Number:** 02 1905-08
**Sampling Location:** A012 - Office Area
**Date Collected:** 4/2/02 **Volume/Area:** 141 L

**TEST REQUESTED:** 1030 AIR, Total FUNGAL Count w/Identifications

Total FUNGAL Count: **78 cfu/m³**

| FUNGUS Isolated: | | |
|---|---|---|
| | Geotrichum species | 27% |
| | Chaetomium species | 18% |
| | Penicillium species | 18% |
| | Aspergillus ochraceous | 9% |

**Detection Limits:** **7 cfu/m³**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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---

**Client Sample Number:** 040202-09 **Lab Sample Number:** 02 1905-09
**Sampling Location:** Outdoor
**Date Collected:** 4/2/02 **Volume/Area:** 141 L

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total BACTERIAL Count: | 7 cfu/m³ | |
| BACTERIA Isolated: | Coag-negative Staphylococcus species | 100% |
| **Date Analyzed:** | 4/5/02 | |
| **Analyst:** | Kay Frick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | 400 cfu/m³ | |
| FUNGUS Isolated: | Cladosporium species | 58% |
| | Sterilia mycelia | 36% |
| | Alternaria species | 2% |
| **Detection Limits:** | 7 cfu/m³ | |
| **Date Analyzed:** | 4/9/02 | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | |

---

**Client Sample Number:** 040202-10 **Lab Sample Number:** 02 1905-10
**Sampling Location:** Mrs. Lampin's Room
**Date Collected:** 4/2/02 **Volume/Area:** 141 L

**TEST REQUESTED:** 1030 AIR, Total FUNGAL Count w/Identifications

| | | |
|---|---|---|
| Total FUNGAL Count: | 35 cfu/m³ | |
| FUNGUS Isolated: | Penicillium species | 40% |
| | Cladosporium species | 20% |
| | Trichoderma species | 20% |
| **Detection Limits:** | 7 cfu/m³ | |
| **Date Analyzed:** | 4/9/02 | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-11 | **Lab Sample Number:** | 02 1905-11 |
| **Sampling Location:** | Blank | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | **0 L** |

**TEST REQUESTED:** 1005 AIR, Total BACTERIAL Count w/Identifications
1030 AIR, Total FUNGAL Count w/Identifications

Total BACTERIAL Count: **No Growth**

**Date Analyzed:** 4/5/02

Total FUNGAL Count: **No Growth**

**Detection Limits:** **N/A**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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---

**Client Sample Number:** 040202-12 **Lab Sample Number:** 02 1905-12
**Sampling Location:** Mrs. Sharpe's Diffuser
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Numerous bacteria seen.
Occasional hyphal elements seen.
No fungal spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Ann Atkinson, B.S., MT (ASCP)

Total FUNGAL Count: **60 cfu/plt**

| | | |
|---|---|---|
| FUNGUS Isolated: | Sterilia mycelia | 67% |
| | Cladosporium species | 33% |

**Detection Limits:** **10 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-13 | **Lab Sample Number:** | 02 1905-13 |
| **Sampling Location:** | Mrs. Sharpe's Diffuser | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1031 WIPE, Total FUNGAL Count w/Identifications
1051 WIPE, Direct Microscopic Exam

**Results:** Occasional Cladosporium spores seen.
Moderate bacteria seen.
Occasional hyphal elements seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Ann Atkinson, B.S., MT (ASCP)

Total FUNGAL Count: **60 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 67% |
| | Yeast | 17% |
| | Cladosporium species | 16% |

**Detection Limits:** **10 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

# APPENDIX B

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102/-01 | **Lab Sample Number:** | 02 1900-01 |
| **Sampling Location:** | Trailer, Drywall & Insulation Over Door Area | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:**
Numerous Chaetomium spores and hyphae seen.
Moderate Penicillium/Aspergillus group spores seen.
Confluent growth of Trichoderma species noted. Quantitation not possible.

No Stachybotrys isolated.

FUNGUS Isolated:
Trichoderma species
Chaetomium species
Aspergillus species
Sterilia mycelia

**Detection Limits:** 16,000 cfu/g

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Date Received:** 4/3/02
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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040102/-02 | **Lab Sample Number:** | 02 1900-02 |
| **Sampling Location:** | Trailer, Drywall | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:**
Numerous Chaetomium spores and hyphae seen.
Few Stachybotrys spores seen.
Confluent growth of Trichoderma species noted. Quantitation not possible.

No Stachybotrys isolated.

FUNGUS Isolated:
Trichoderma species
Penicillium species
Chaetomium species
Sterilia mycelia

**Detection Limits:** 24,000 cfu/g

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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---

**Client Sample Number:** 040102/-03 **Lab Sample Number:** 02 1900-03
**Sampling Location:** Trailer 1; Drywall Over Window
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Stachybotrys spores and hyphae seen.
Few Chaetomium spores seen.
Confluent growth of Trichoderma species noted. Quantitation not possible.

No Stachybotrys isolated.

FUNGUS Isolated: Trichoderma species
Penicillium species
Chaetomium species
Sterilia mycelia

**Detection Limits:** **14,000 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

---

**Client Sample Number:** 040102/-04 **Lab Sample Number:** 02 1900-04
**Sampling Location:** Trailer 2; Drywall Under Molding Near Teacher's Desk
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Chaetomium spores and hyphae seen.
No Stachybotrys isolated.

Total FUNGAL Count: **$3.9 \times 10^6$ cfu/g**

FUNGUS Isolated: Aspergillus ustus 71%
Penicillium species 29%

**Detection Limits:** **20,000 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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---

**Client Sample Number:** 040102/-05 **Lab Sample Number:** 02 1900-05
**Sampling Location:** Trailer 2; Wood From Window Sill
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous brown unidentified spores seen.
No Stachybotrys isolated.

Total FUNGAL Count: **12,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Acremonium species | 63% |
| | Aspergillus ustus | 35% |
| | Penicillium species | 2% |

**Detection Limits:** **170 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

---

**Client Sample Number:** 040102/-06 **Lab Sample Number:** 02 1900-06
**Sampling Location:** Trailer 1; Molding Door Side
**Date Collected:** 4/1/02 **Volume/Area:** **2 sq in**

**TEST REQUESTED:** 1066 WIPE, Stachybotrys & Total Fungal Culture, Direct Read

**Results:** Numerous Chaetomium spores and hyphae seen.
Moderate Penicillium/Aspergillus group and colorless spores seen.
Confluent growth of Trichoderma species noted. Quantitation not possible.

No Stachybotrys isolated.

FUNGUS Isolated:
Trichoderma species
Penicillium species
Sterilia mycelia

**Detection Limits:** **500 cfu/in²**

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

---

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---

**Client Sample Number:** 040102/-07 **Lab Sample Number:** 02 1900-07
**Sampling Location:** Trailer 1; Drywall Over Window
**Date Collected:** 4/1/02 **Volume/Area:** 2 sq in

**TEST REQUESTED:** 1066 WIPE, Stachybotrys & Total Fungal Culture, Direct Read

**Results:** Numerous Stachybotrys spores and hyphae seen.
Few Chaetomium and colorless spores seen.
No Stachybotrys isolated.

Total FUNGAL Count: **17,000 cfu/in²**

| FUNGUS Isolated: | | |
|---|---|---|
| | Aspergillus species | 33% |
| | Aspergillus ustus | 30% |
| | Aspergillus sydowii | 24% |

**Detection Limits:** **500 cfu/in²**

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

---

**Client Sample Number:** 040102/-08 **Lab Sample Number:** 02 1900-08
**Sampling Location:** Trailer 1; Molding - Window Side
**Date Collected:** 4/1/02 **Volume/Area:** 1 sq in

**TEST REQUESTED:** 1066 WIPE, Stachybotrys & Total Fungal Culture, Direct Read

**Results:** Numerous Stachybotrys spores and hyphae seen.
Few Chaetomium spores seen.
No Stachybotrys isolated.

Total FUNGAL Count: **3300 cfu/in²**

| FUNGUS Isolated: | | |
|---|---|---|
| | Chaetomium species | 42% |
| | Aspergillus terreus | 15% |
| | Aspergillus sydowii | 15% |

**Detection Limits:** **100 cfu/in²**

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Job ID:** 02 1900

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**Client Sample Number:** 040102/-09 **Lab Sample Number:** 02 1900-09
**Sampling Location:** Trailer 2; Paneling
**Date Collected:** 4/1/02 **Volume/Area:** 2 sq in

**TEST REQUESTED:** 1066 WIPE, Stachybotrys & Total Fungal Culture, Direct Read

**Results:** Moderate Chaetomium spores and hyphae seen.
Few colorless and Penicillium/Aspergillus group spores seen.
No Stachybotrys isolated.

Total FUNGAL Count: 13,000 cfu/in²

FUNGUS Isolated: Chaetomium species 100%
**Detection Limits:** 500 cfu/in²

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

---

**Client Sample Number:** 040102/-10 **Lab Sample Number:** 02 1900-10
**Sampling Location:** Trailer 2; Paneling
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam

**Results:** Numerous Chaetomium spores and hyphae seen.
Moderate large brown unidentified spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

---

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**420 Rouser Rd. Airport Office Park Bldg 3**
**Corapolis, PA 15108**
**Attn:**
**Project: Brittin E. S.**

**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 7 of 7**
**Job ID:** 02 1900

---

**Client Sample Number:** 040102/-11 **Lab Sample Number:** 02 1900-11
**Sampling Location:** Trailer 2; Window Sill Near Teachers Desk
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam

**Results:** Numerous brown unidentified spores seen.

**Detection Limits:** N / A

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

---

**Client Sample Number:** 040102/-12 **Lab Sample Number:** 02 1900-12
**Sampling Location:** Trailer 1; Under Molding Near Door
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam

**Results:** Numerous Chaetomium spores and hyphae seen.
Numerous Trichoderma spores seen.

**Detection Limits:** N / A

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

---

**Client Sample Number:** 040102/-13 **Lab Sample Number:** 02 1900-13
**Sampling Location:** Trailer 1; Ceiling Tile Near Door
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam

**Results:** Numerous Trichoderma spores seen.
Moderate Chaetomium spores seen.

**Detection Limits:** N / A

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

---

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**Date Received:** 4/4/02
**Date Reported:** 4/4/02
**Page 1 of 8**
**Job ID:** 02 1912

---

**Client Sample Number:** 040202-01 **Lab Sample Number:** 02 1912-01
**Sampling Location:** Trailer 3: Drywall Over Copier
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Aspergillus spores and conidiophores seen.
Numerous Chaetomium spores and hyphae seen.
No Stachybotrys isolated.

Total FUNGAL Count: **1.7x10$^7$ cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Aspergillus species | 100% |

**Detection Limits:** **21,000 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

---

**Client Sample Number:** 040202-02 **Lab Sample Number:** 02 1912-02
**Sampling Location:** Trailer 3: Drywall Over Corkboard
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Stachybotrys spores and hyphae seen.
No Stachybotrys isolated.

Total FUNGAL Count: **41,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Aspergillus species | 81% |
| | Sterilia mycelia | 17% |
| | Paecilomyces species | 2% |

**Detection Limits:** **200 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

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**Job ID:** 02 1912

---

**Client Sample Number:** 040202-03 **Lab Sample Number:** 02 1912-03
**Sampling Location:** Trailer 3: Ceiling Over Gray Locker
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** No fungal spores seen.
No Stachybotrys isolated.

Total FUNGAL Count: **140,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Aspergillus species | 93% |
| | Paecilomyces species | 4% |
| | Penicillium species | 2% |

**Detection Limits:** **2100 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

---

**Client Sample Number:** 040202-04 **Lab Sample Number:** 02 1912-04
**Sampling Location:** Trailer 4: Drywall Over Window
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Chaetomium spores and hyphae seen.
Numerous Penicillium/Aspergillus group spores seen.
No Stachybotrys isolated.

Total FUNGAL Count: **$1.4x10^6$ cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Aspergillus species | 69% |
| | Chaetomium species | 18% |
| | Sterilia mycelia | 10% |

**Detection Limits:** **21,000 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

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**Page 3 of 8**
**Job ID:** 02 1912

---

**Client Sample Number:** 040202-05 **Lab Sample Number:** 02 1912-05
**Sampling Location:** Trailer 4: Paneling Near Teachers Desk
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:**
Numerous dark hyphal elements seen.
Few brown unidentified spores seen.
No Stachybotrys isolated.

Total FUNGAL Count: **390,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Yeast | 56% |
| | Fusarium species | 33% |
| | Penicillium species | 11% |

**Detection Limits:** **22,000 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

---

**Client Sample Number:** 040202-06 **Lab Sample Number:** 02 1912-06
**Sampling Location:** Trailer 4: Ceiling Around Diffuser
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:**
Few Stachybotrys spores seen.
No Stachybotrys isolated.

Total FUNGAL Count: **180,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Yeast (mixed species) | 97% |
| | Penicillium species | 2% |
| | Aspergillus species | 1% |

**Detection Limits:** **2000 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

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**Job ID:** 02 1912

---

**Client Sample Number:** 040202-07 **Lab Sample Number:** 02 1912-07
**Sampling Location:** Trailer 4: Ceiling Over Teacher's Desk
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Moderate Stachybotrys spores seen.
No Stachybotrys isolated.

Total FUNGAL Count: **250,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Aspergillus species | 56% |
| | Penicillium species | 20% |
| | Chaetomium species | 13% |

**Detection Limits:** **2200 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

---

**Client Sample Number:** 040202-08 **Lab Sample Number:** 02 1912-08
**Sampling Location:** Trailer 4: Drywall Over Chalkboard
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Stachybotrys spores and hyphae seen.
Moderate Penicillium/Aspergillus group spores seen.

Total FUNGAL Count: **120,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Stachybotrys chartarum (atra) | 50% |
| | Aspergillus species | 50% |

**Detection Limits:** **190 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

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**Client Sample Number:** 040202-09 **Lab Sample Number:** 02 1912-09
**Sampling Location:** Trailer 5: Wallpaper In Bathroom Area
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Cladosporium spores and hyphae seen.
No Stachybotrys isolated.

Total FUNGAL Count: **210,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Yeast (mixed species) | 94% |
| | Cladosporium species | 4% |
| | Aspergillus species | 2% |

**Detection Limits:** **2300 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

---

**Client Sample Number:** 040202-10 **Lab Sample Number:** 02 1912-10
**Sampling Location:** Trailer 5: Bathroom Ceiling
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Cladosporium spores and hyphae seen.
No Stachybotrys isolated.

Total FUNGAL Count: **530,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Paecilomyces species | 69% |
| | Cladosporium species | 31% |

**Detection Limits:** **20,000 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

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---

**Client Sample Number:** 040202-11 **Lab Sample Number:** 02 1912-11
**Sampling Location:** Trailer 6: Drywall
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Chaetomium spores and hyphae seen.
No Stachybotrys isolated.

Total FUNGAL Count: **950,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Chaetomium species | 68% |
| | Aspergillus species | 32% |

**Detection Limits:** **25,000 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

---

**Client Sample Number:** 040202-12 **Lab Sample Number:** 02 1912-12
**Sampling Location:** Trailer 6: Drywall Under Paneling
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Aspergillus spores and conidiophores seen.
Few to moderate Chaetomium spores seen.
No Stachybotrys isolated.

Total FUNGAL Count: **$5.3 \times 10^6$ cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Aspergillus sydowii | 97% |
| | Penicillium species | 2% |
| | Trichoderma species | 1% |

**Detection Limits:** **21,000 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

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**Job ID:** 02 1912

---

**Client Sample Number:** 040202-13 **Lab Sample Number:** 02 1912-13
**Sampling Location:** Trailer 6: Ceiling Tile
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:**
Numerous Trichoderma spores seen.
Few to moderate Chaetomium spores seen.
Confluent growth of Trichoderma species noted. Quantitation not possible.

Unable to determine the presence/absence of Stachybotrys due to overgrowth of interfering fungus.

FUNGUS Isolated: Trichoderma species 100%
**Detection Limits:** **220 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

---

**Client Sample Number:** 040202-14 **Lab Sample Number:** 02 1912-14
**Sampling Location:** Trailer 6: Ceiling
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:**
Numerous Chaetomium spores and hyphae seen.
Moderate Penicilium/Aspergillus group spores seen.
No Stachybotrys isolated.

Total FUNGAL Count: **740,000 cfu/g**

FUNGUS Isolated: Chaetomium species 70%
Aspergillus species (multiple types) 30%
**Detection Limits:** **20,000 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

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**Attn:**
**Project: Brittin E. S.**

**Date Received:** 4/4/02
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**Job ID:** 02 1912

---

**Client Sample Number:** 040202-15 **Lab Sample Number:** 02 1912-15
**Sampling Location:** Trailer 6: Paneling Above Door
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Chaetomium spores and hyphae seen.
No Stachybotrys isolated.

Total FUNGAL Count: **39,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Aspergillus species (multiple types) | 65% |
| | Penicillium species | 20% |
| | Trichoderma species | 15% |

**Detection Limits:** **2000 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

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**Client Sample Number:** 040202-16 **Lab Sample Number:** 02 1912-16
**Sampling Location:** Trailer 6: Drywall Over Window
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1035 BULK, Stachybotrys Culture, Direct Microscopic Exam & Total Fungal

**Results:** Numerous Chaetomium spores and hyphae seen.
Numerous Aspergillus spores and conidiophores seen.
No Stachybotrys isolated.

Total FUNGAL Count: **$1.9 \times 10^6$ cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Aspergillus species | 88% |
| | Chaetomium species | 12% |

**Detection Limits:** **24,000 cfu/g**

**Date Analyzed:** 4/11/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

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# APPENDIX C

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1894

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-01 | **Lab Sample Number:** | 02 1894-01 |
| **Sampling Location:** | Scholastic Red Boxes - Inside & Out | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional algae cells seen.
Moderate pollen grains seen.
Occasional Curvularia spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

| | | |
|---|---|---|
| Total FUNGAL Count: | **1300 cfu/plt** | |
| FUNGUS Isolated: | Yeast (mixed species) | 46% |
| | Cladosporium species | 31% |
| | Epicoccum species | 15% |
| **Detection Limits:** | **100 cfu/plt** | |
| **Date Analyzed:** | 4/9/02 | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | |

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 2 of 6**
**Job ID:** 02 1894

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-02 | **Lab Sample Number:** | 02 1894-02 |
| **Sampling Location:** | Brown Cardboard Box - Grey Books inside | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Moderate pollen grains seen.
Occasional algae cells seen.
No fungal spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **1800 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 67% |
| | Cladosporium species | 17% |
| | Epicoccum species | 11% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Job ID:** 02 1894

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-03 | **Lab Sample Number:** | 02 1894-03 |
| **Sampling Location:** | Brown Cardboard Box - On Floor Next to Door & Contents | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen.
Moderate bacteria seen.
Occasional Cladosporium spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **2300 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 48% |
| | Cladosporium species | 26% |
| | Curvularia species | 9% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-04 | **Lab Sample Number:** | 02 1894-04 |
| **Sampling Location:** | Pink "Signature" Binders | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |
| **TEST REQUESTED:** | 1051 WIPE, Direct Microscopic Exam<br>1031 WIPE, Total FUNGAL Count w/Identifications | | |
| **Results:** | Moderate bacteria seen.<br>Numerous pollen grains seen.<br>No fungal spores seen. | | |
| **Detection Limits:** | N/A | | |
| **Date Analyzed:** | 4/3/02 | | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | | |
| Total FUNGAL Count: | **1900 cfu/plt** | | |
| FUNGUS Isolated: | Cladosporium species | | 53% |
| | Sterilia mycelia | | 26% |
| | Epicoccum species | | 16% |
| **Detection Limits:** | **100 cfu/plt** | | |
| **Date Analyzed:** | 4/9/02 | | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | | |

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**Date Received:** 4/3/02
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**Job ID:** 02 1894

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-05 | **Lab Sample Number:** | 02 1894-05 |
| **Sampling Location:** | White Crate Contents | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Moderate pollen grains seen. Occasional hyphal elements seen.
Occasional Curvularia spores seen.
Occasional Drechslera/Bipolaris group spores seen.
Occasional Pestalotiopsis spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **1200 cfu/plt**

| | | |
|---|---|---|
| FUNGUS Isolated: | Epicoccum species | 33% |
| | Yeast (mixed species) | 25% |
| | Sterilia mycelia | 25% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-06 | **Lab Sample Number:** | 02 1894-06 |
| **Sampling Location:** | Pink "Language Handbooks" on Bookshelf | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |
| **TEST REQUESTED:** | 1051 WIPE, Direct Microscopic Exam<br>1031 WIPE, Total FUNGAL Count w/Identifications | | |
| **Results:** | Occasional smuts seen.<br>Occasional hyphal elements seen.<br>Occasional pollen grains seen.<br>Occasional ascospores seen. | | |
| **Detection Limits:** | N/A | | |
| **Date Analyzed:** | 4/3/02 | | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | | |
| Total FUNGAL Count: | 50 cfu/plt | | |
| FUNGUS Isolated: | Sterilia mycelia | | 60% |
| | Cladosporium species | | 40% |
| **Detection Limits:** | 10 cfu/plt | | |
| **Date Analyzed:** | 4/9/02 | | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | | |

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**Corapolis, PA 15108**
**Attn:**
**Project: 13A-Brittin ES**

**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1895

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**Client Sample Number:** 040202-01 **Lab Sample Number:** 02 1895-01
**Sampling Location:** Tops of Blue Tubs
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional Drechslera spores seen.
Occasional Epicoccum spores seen.
Numerous bacteria seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Ann Atkinson, B.S., MT (ASCP)

Total FUNGAL Count: **2300 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Yeast (mixed species) | 57% |
| | Sterilia mycelia | 26% |
| | Cladosporium species | 13% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Job ID:** 02 1895

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**Client Sample Number:** 040202-02 **Lab Sample Number:** 02 1895-02
**Sampling Location:** "Discovery Works" Science Notebooks
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional yeast cells seen.
Occasional pollen grains seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Ann Atkinson, B.S., MT (ASCP)

Total FUNGAL Count: **5000 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Yeast (mixed species) | 74% |
| | Sterilia mycelia | 10% |
| | Cladosporium species | 10% |
| | Aspergillus niger | 2% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Job ID:** 02 1895

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 040202-03 | **Lab Sample Number:** | 02 1895-03 |
| **Sampling Location:** | "Your Health" Books | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Moderate bacteria seen.
Few pollen grains seen.
No fungal spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Ann Atkinson, B.S., MT (ASCP)

Total FUNGAL Count: **34,000 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Yeast (mixed species) | 82% |
| | Sterilia mycelia | 9% |
| | Cladosporium species | 6% |

**Detection Limits:** **1000 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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---

**Client Sample Number:** 040202-04 **Lab Sample Number:** 02 1895-04
**Sampling Location:** White Cart - Top Shelf - Paperback Books
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Few pollen grains seen.
No fungal spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Ann Atkinson, B.S., MT (ASCP)

Total FUNGAL Count: **1500 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 47% |
| | Yeast (mixed species) | 40% |
| | Geotrichum species | 7% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Job ID:** 02 1895

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**Client Sample Number:** 040202-05 **Lab Sample Number:** 02 1895-05
**Sampling Location:** Old Newspapers Stacked in Back of Room
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional Drechslera spores seen.
Occasional hyphal elements seen.
Occasional pollen grains seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Ann Atkinson, B.S., MT (ASCP)

Total FUNGAL Count: **900 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 44% |
| | Sterilia mycelia | 33% |
| | Yeast (mixed species) | 22% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Date Received:** 4/3/02
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**Job ID:** 02 1895

---

**Client Sample Number:** 040202-06 **Lab Sample Number:** 02 1895-06
**Sampling Location:** Wooden Shelf Contents on Teachers Desk
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional pollen grains seen.
No fungal spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Ann Atkinson, B.S., MT (ASCP)

Total FUNGAL Count: **1800 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Yeast (mixed species) | 61% |
| | Sterilia mycelia | 28% |
| | Cladosporium species | 11% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Date Reported:** 4/4/02
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**Job ID:** 02 1896

---

**Client Sample Number:** 040202-01 **Lab Sample Number:** 02 1896-01
**Sampling Location:** Blue World Books
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Numerous bacteria seen.
Numerous pollen grains seen.
Occasional algae cells seen.
No fungal spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **6700 cfu/plt**

| | | |
|---|---|---|
| FUNGUS Isolated: | Yeast | 96% |
| | Fusarium species | 1% |
| | Cladosporium species | 1% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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---

**Client Sample Number:** 040202-02 **Lab Sample Number:** 02 1896-02
**Sampling Location:** Books "The World Past And Present"
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Moderate bacteria seen.
Numerous pollen grains seen.
Occasional hyphal elements seen.
No fungal spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **2000 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 50% |
| | Rhodotorula species | 20% |
| | Epicoccum species | 20% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Job ID:** 02 1896

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**Client Sample Number:** 040202-03 **Lab Sample Number:** 02 1896-03
**Sampling Location:** Contents of Gray Crate on Bookshelf
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional ascospores seen.
Occasional hyphal elements seen.
Occasional pollen grains seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **2300 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 43% |
| | Epicoccum species | 22% |
| | Rhodotorula species | 17% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Job ID:** 02 1896

---

**Client Sample Number:** 040202-04 **Lab Sample Number:** 02 1896-04
**Sampling Location:** Lrg "Hands on Geography" Box on Top of Lrg Grey Shelf
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional Curvularia spores seen.
Occasional pollen grains seen.
Occasional hyphal elements seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **520 cfu/plt**

| | | |
|---|---|---|
| FUNGUS Isolated: | Sterilia mycelia | 38% |
| | Cladosporium species | 29% |
| | Epicoccum species | 19% |

**Detection Limits:** 10 cfu/plt

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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---

**Client Sample Number:** 040202-05 **Lab Sample Number:** 02 1896-05
**Sampling Location:** Vinyl Math Posters on Wall (4 in a set)
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional ascospores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

| | | |
|---|---|---|
| Total FUNGAL Count: | **210 cfu/plt** | |
| FUNGUS Isolated: | Sterilia mycelia | 62% |
| | Epicoccum species | 24% |
| | Cladosporium species | 14% |
| **Detection Limits:** | **10 cfu/plt** | |
| **Date Analyzed:** | 4/9/02 | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | |

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Client Sample Number:** 040202-06 **Lab Sample Number:** 02 1896-06
**Sampling Location:** Set of Paper "World Atlas" For Intermediate Students
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Few pollen grains seen.
Occasional Cladosporium spores seen.
Occasional smuts seen.
Occasional hyphal elements seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **2700 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 37% |
| | Epicoccum species | 30% |
| | Sterilia mycelia | 26% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 1 | **Lab Sample Number:** | 02 1898-01 |
| **Sampling Location:** | Trailer 6; Composite Of Large Blue Box #1 | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | **N/A** |

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** No fungal spores seen.

**Detection Limits:** **N/A**

**Date Analyzed:** 4/3/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

Total FUNGAL Count: **290 cfu/plt**

| | | |
|---|---|---|
| FUNGUS Isolated: | Penicillium species | 34% |
| | Sterilia mycelia | 17% |
| | Yeast | 21% |
| | Fusarium species | 10% |

**Detection Limits:** **10 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Date Received:** 4/3/02
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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 2 | **Lab Sample Number:** | 02 1898-02 |
| **Sampling Location:** | Trailer 6; Composite Of Large Blue Box #2 | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | **N/A** |

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional pollen grains seen.
No fungal spores seen.

**Detection Limits:** **N/A**

**Date Analyzed:** 4/3/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

Total FUNGAL Count: **270 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 41% |
| | Cladosporium species | 26% |
| | Penicillium species | 19% |

**Detection Limits:** **10 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Date Received:** 4/3/02
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**Job ID:** 02 1898

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**Client Sample Number:** 3 **Lab Sample Number:** 02 1898-03
**Sampling Location:** Trailer 6 Shoebox Library Boxes (2)
**Date Collected:** 4/2/02 **Volume/Area:** N/A

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Numerous colorless spores seen.
Moderate Chaetomium spores seen.
Few hyphal elements seen.
Few pollen grains seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/3/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

Total FUNGAL Count: **52,000 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Penicillium species | 52% |
| | Cladosporium species | 27% |
| | Chaetomium species | 21% |

**Detection Limits:** **1000 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 4 | **Lab Sample Number:** | 02 1898-04 |
| **Sampling Location:** | Trailer 6 "Jumping Levels" Boxes | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | **N/A** |
| **TEST REQUESTED:** | 1051 WIPE, Direct Microscopic Exam<br>1031 WIPE, Total FUNGAL Count w/Identifications | | |
| **Results:** | Few colorless spores seen. | | |
| **Detection Limits:** | **N/A** | | |
| **Date Analyzed:** | 4/3/02 | | |
| **Analyst:** | Jane P. Gardner, MHS, MT (ASCP) | | |
| Total FUNGAL Count: | **60 cfu/plt** | | |
| FUNGUS Isolated: | Sterilia mycelia | | 50% |
| | Cladosporium species | | 17% |
| | Penicillium species | | 17% |
| **Detection Limits:** | **10 cfu/plt** | | |
| **Date Analyzed:** | 4/9/02 | | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | | |

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**Client Sample Number:** 5 **Lab Sample Number:** 02 1898-05
**Sampling Location:** Trailer 6; Baby Wipe Boxes
**Date Collected:** 4/2/02 **Volume/Area:** **N/A**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional Curvularia spores seen.
Occasional pollen grains seen.
Occasional hyphal elements seen.

**Detection Limits:** **N/A**

**Date Analyzed:** 4/3/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

Total FUNGAL Count: **2000 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 45% |
| | Yeast (mixed species) | 40% |
| | Penicillium species | 10% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 6 | **Lab Sample Number:** | 02 1898-06 |
| **Sampling Location:** | Trailer 6; Books 3.0-3.9 | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | **N/A** |

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional pollen grains seen.
Few colorless spores seen.

**Detection Limits:** **N/A**

**Date Analyzed:** 4/3/02

**Analyst:** Jane P. Gardner, MHS, MT (ASCP)

Total FUNGAL Count: **1100 cfu/plt**

| FUNGUS Isolated: | | |
|---|---|---|
| | Yeast (mixed species) | 36% |
| | Chaetomium species | 27% |
| | Cladosporium species | 27% |

**Detection Limits:** **100 cfu/plt**

**Date Analyzed:** 4/9/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Date Received:** 4/3/02
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**Job ID:** 02 1906

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**Client Sample Number:** 04/0102-01 **Lab Sample Number:** 02 1906-01
**Sampling Location:** C-3 Lg Cardboard Box
**Date Collected:** 4/1/02 **Volume/Area:** 3 sq in

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional Curvularia spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: 7 cfu/in²

| FUNGUS Isolated: | | |
|---|---|---|
| | Curvularia species | 50% |
| | Yeast | 50% |

**Detection Limits:** 3 cfu/in²

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

---

**Client Sample Number:** 04/0102-02 **Lab Sample Number:** 02 1906-02
**Sampling Location:** C-3 Cardboard Cow
**Date Collected:** 4/1/02 **Volume/Area:** 3 sq in

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** Occasional ascospores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: 3 cfu/in²

| FUNGUS Isolated: | | |
|---|---|---|
| | Rhodotorula species | 100% |

**Detection Limits:** 3 cfu/in²

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Corapolis, PA 15108**
**Attn:**
**Project: Brittin ES**

**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 2 of 4**
**Job ID:** 02 1906

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 04/0102-03 | **Lab Sample Number:** | 02 1906-03 |
| **Sampling Location:** | C-3 Paper Mache Violin | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | **3 sq in** |

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** No fungal spores seen.

**Detection Limits:** **N/A**

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **24 cfu/in²**

| | | |
|---|---|---|
| FUNGUS Isolated: | Sterilia mycelia | 50% |
| | Trichoderma species | 13% |
| | Epicoccum species | 13% |

**Detection Limits:** **3 cfu/in²**

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 3 of 4**
**Job ID:** 02 1906

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 04/0102-04 | **Lab Sample Number:** | 02 1906-04 |
| **Sampling Location:** | C-3 Brown Box w/Orange Edge | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | 3 sq in |

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam
1031 WIPE, Total FUNGAL Count w/Identifications

**Results:** No fungal spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: 50 cfu/in²

| | | |
|---|---|---|
| FUNGUS Isolated: | Yeast (mixed species) | 67% |
| | Sterilia mycelia | 20% |
| | Trichoderma species | 7% |

**Detection Limits:** 3 cfu/in²

**Date Analyzed:** 4/10/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 4 of 4**
**Job ID:** 02 1906

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 04/0102-05 | **Lab Sample Number:** | 02 1906-05 |
| **Sampling Location:** | C-3 Paper Mache Cake | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | 3 sq in |

| | | |
|---|---|---|
| **TEST REQUESTED:** | 1051 WIPE, Direct Microscopic Exam<br>1031 WIPE, Total FUNGAL Count w/Identifications | |
| **Results:** | Occasional Epicoccum spores seen. | |
| **Detection Limits:** | N/A | |
| **Date Analyzed:** | 4/4/02 | |
| Total FUNGAL Count: | 110 cfu/in² | |
| FUNGUS Isolated: | Yeast | 82% |
| | Sterilia mycelia | 12% |
| | Epicoccum species | 3% |
| **Detection Limits:** | 3 cfu/in² | |
| **Date Analyzed:** | 4/10/02 | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | |

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 1 of 2**
**Job ID:** 02 1909

---

**Client Sample Number:** 040202-01 **Lab Sample Number:** 02 1909-01
**Sampling Location:** Room B8; Under Sink
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam

**Results:** Moderate basidiospores seen.

**Detection Limits:** N / A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

---

**Client Sample Number:** 040202-02 **Lab Sample Number:** 02 1909-02
**Sampling Location:** Room B8; Under Sink
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam

**Results:** Numerous basidiospores seen.
Occasional Epicoccum spores seen.
Moderate hyphal elements seen.

**Detection Limits:** N / A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

---

**Client Sample Number:** 040202-03 **Lab Sample Number:** 02 1909-03
**Sampling Location:** Trailer 6; Front of Paneling
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam

**Results:** Numerous Chaetomium spores and hyphae seen.
Numerous Cladosporium spores seen.
Moderate hyphal elements seen.

**Detection Limits:** N / A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 2 of 2**
**Job ID:** 02 1909

---

**Client Sample Number:** 040202-04 **Lab Sample Number:** 02 1909-04
**Sampling Location:** Trailer 6; Back of Paneling
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam

**Results:**
Numerous Chaetomium spores and hyphae seen.
Numerous Penicillium/Aspergillus group spores seen.
Numerous hyphal elements seen.

**Detection Limits:** N / A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

---

**Client Sample Number:** 040202-05 **Lab Sample Number:** 02 1909-05
**Sampling Location:** Room B8; Soccer Ball
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam

**Results:**
Few Drechslera/Bipolaris group spores seen.
Few Chaetomium spores and hyphae seen.
Occasional ascospores seen. Few pollen grains seen.
Occasional Epicoccum spores seen.

**Detection Limits:** N / A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

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**Attn:**
**Project: 23970-011-0001-00002**

**Date Received:** 4/4/02
**Date Reported:** 4/4/02
**Page 1 of 1**
**Job ID:** 02 1916

| | | | |
|---|---|---|---|
| **Client Sample Number:** | T4302-1 | **Lab Sample Number:** | 02 1916-01 |
| **Sampling Location:** | Composite Tape Lift, Under Carpet By Door Of Rm A10 | | |
| **Date Collected:** | 00/00/00 | **Volume/Area:** | |

**TEST REQUESTED:** 1051 WIPE, Direct Microscopic Exam

**Results:** Occasional basidiospores seen.
Occasional hyphal elements seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Ann Atkinson, B.S., MT (ASCP)

# APPENDIX D

AEROBIOLOGY LABORATORY
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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 1 of 30**
**Job ID:** 02 1899

**Client Sample Number:** 040202-01 **Lab Sample Number:** 02 1899-01
**Sampling Location:** Room C3-Front Of Room
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | 22 | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | 11 | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | 11 | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | 44 | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |
| **TOTAL SPORES:** | **88** | **Spores/m$^3$** |

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 2 of 30**
**Job ID:** 02 1899

**Client Sample Number:** 040202-02 **Lab Sample Number:** 02 1899-02
**Sampling Location:** Room C3-Back Of Room
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m3 |
| Ascospores | | Spores/m3 |
| Basidiospores | | Spores/m3 |
| Smuts, Periconia, Myxomycetes | | Spores/m3 |
| Penicillium/Aspergillus group | | Spores/m3 |
| Alternaria | | Spores/m3 |
| Drechslera / Bipolaris group | | Spores/m3 |
| Colorless | | Spores/m3 |
| Arthrinium | | Spores/m3 |
| Curvularia | | Spores/m3 |
| Stachybotrys | | Spores/m3 |
| Trichocladium | | Spores/m3 |
| Unknown | | Spores/m3 |
| Hyphal Elements | 22 | Spores/m3 |
| Torula herbarum | | Spores/m3 |
| Geotrichum | | Spores/m3 |
| Epicoccum | | Spores/m3 |
| Pithomyces | | Spores/m3 |
| Chaetomium | 11 | Spores/m3 |
| Ulocladium | | Spores/m3 |
| Rusts | | Spores/m3 |
| Clear brown | | Spores/m3 |
| **TOTAL SPORES:** | **33** | **Spores/m3** |

**Detection Limits:** 11 Spores/m3

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-03 **Lab Sample Number:** 02 1899-03
**Sampling Location:** Room C1-Front Of Room
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |
| **TOTAL SPORES:** | **<11 Spores/m$^3$** | **Spores/m$^3$** |

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Attn:**
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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 4 of 30**
**Job ID:** 02 1899

**Client Sample Number:** 040202-04 **Lab Sample Number:** 02 1899-04
**Sampling Location:** Room C1-Back Of Room
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | 11 | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** 11 **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02

**Job ID:** 02 1899

**Client Sample Number:** 040202-05
**Lab Sample Number:** 02 1899-05
**Sampling Location:** Room C2
**Date Collected:** 4/2/02
**Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** **<11 Spores/m$^3$** **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-06
**Lab Sample Number:** 02 1899-06
**Sampling Location:** Room C4
**Date Collected:** 4/2/02
**Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | 11 | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | 11 | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** 22 **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Attn:**
**Project: Brittin ES**

**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 7 of 30**
**Job ID:** 02 1899

**Client Sample Number:** 040202-07
**Lab Sample Number:** 02 1899-07
**Sampling Location:** Room C6
**Date Collected:** 4/2/02
**Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | 11 | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** 11 Spores/m$^3$

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Attn:**
**Project: Brittin ES**

**Date Received:** 4/3/02
**Date Reported:** 4/4/02

**Job ID:** 02 1899

**Client Sample Number:** 040202-08 **Lab Sample Number:** 02 1899-08
**Sampling Location:** Room C12-Control
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | 11 | Spores/m$^3$ |
| Basidiospores | 11 | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | 22 | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | 11 | Spores/m$^3$ |
| Hyphal Elements | 11 | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** 66 **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Michael Baker Corp.**
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**Corapolis, PA 15108**
**Attn:**
**Project: Brittin ES**

**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 9 of 30**
**Job ID:** 02 1899

**Client Sample Number:** 040202-09 **Lab Sample Number:** 02 1899-09
**Sampling Location:** Room B6-Front
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | 22 | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | 22 | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** **44** **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02

**Job ID:** 02 1899

**Client Sample Number:** 040202-10 **Lab Sample Number:** 02 1899-10
**Sampling Location:** Room B6-Back
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m3 |
| Ascospores | | Spores/m3 |
| Basidiospores | | Spores/m3 |
| Smuts, Periconia, Myxomycetes | 11 | Spores/m3 |
| Penicillium/Aspergillus group | | Spores/m3 |
| Alternaria | | Spores/m3 |
| Drechslera / Bipolaris group | | Spores/m3 |
| Colorless | | Spores/m3 |
| Arthrinium | | Spores/m3 |
| Curvularia | | Spores/m3 |
| Stachybotrys | | Spores/m3 |
| Trichocladium | | Spores/m3 |
| Unknown | | Spores/m3 |
| Hyphal Elements | 11 | Spores/m3 |
| Torula herbarum | | Spores/m3 |
| Geotrichum | | Spores/m3 |
| Epicoccum | | Spores/m3 |
| Pithomyces | | Spores/m3 |
| Chaetomium | | Spores/m3 |
| Ulocladium | | Spores/m3 |
| Rusts | | Spores/m3 |
| Clear brown | | Spores/m3 |

**TOTAL SPORES:** **22** **Spores/m3**

**Detection Limits:** 11 Spores/m3

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-11 **Lab Sample Number:** 02 1899-11
**Sampling Location:** Room B5
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | 33 | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** **33** **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02

**Job ID:** 02 1899

**Client Sample Number:** 040202-12 **Lab Sample Number:** 02 1899-12
**Sampling Location:** Room B8
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | 22 | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** 22 **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02

**Job ID:** 02 1899

**Client Sample Number:** 040202-13
**Sampling Location:** Room B12-Control
**Date Collected:** 4/2/02

**Lab Sample Number:** 02 1899-13
**Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | 11 | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | 11 | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** 22 **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-14 **Lab Sample Number:** 02 1899-14
**Sampling Location:** Room 4A
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | 11 | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** 11 **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02

**Job ID:** 02 1899

**Client Sample Number:** 040202-15 **Lab Sample Number:** 02 1899-15
**Sampling Location:** Room 5A
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | 11 | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** 11 **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-16
**Lab Sample Number:** 02 1899-16
**Sampling Location:** Room 7A-Control
**Date Collected:** 4/2/02
**Volume/Area:** 90 L

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |
| **TOTAL SPORES:** | **<11 Spores/m$^3$** | **Spores/m$^3$** |

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02

**Job ID:** 02 1899

**Client Sample Number:** 040202-17
**Sampling Location:** Room 8A
**Date Collected:** 4/2/02

**Lab Sample Number:** 02 1899-17
**Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** **<11 Spores/m$^3$** **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-18
**Lab Sample Number:** 02 1899-18
**Sampling Location:** Room 10A
**Date Collected:** 4/2/02
**Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | 11 | Spores/m$^3$ |
| Ascospores | 11 | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | 11 | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | 11 | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |
| **TOTAL SPORES:** | **44** | **Spores/m$^3$** |

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-19
**Lab Sample Number:** 02 1899-19
**Sampling Location:** Room 11A
**Date Collected:** 4/2/02
**Volume/Area:** 90 L

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | 11 | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | 11 | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | 11 | Spores/m$^3$ |

**TOTAL SPORES:** 33 Spores/m$^3$

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 20 of 30**
**Job ID:** 02 1899

**Client Sample Number:** 040202-20
**Sampling Location:** Room 13A
**Date Collected:** 4/2/02

**Lab Sample Number:** 02 1899-20
**Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** **<11 Spores/m$^3$** **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Corapolis, PA 15108**
**Attn:**
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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-21
**Lab Sample Number:** 02 1899-21
**Sampling Location:** A 012 Area
**Date Collected:** 4/2/02
**Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m3 |
| Ascospores | 22 | Spores/m3 |
| Basidiospores | | Spores/m3 |
| Smuts, Periconia, Myxomycetes | | Spores/m3 |
| Penicillium/Aspergillus group | | Spores/m3 |
| Alternaria | | Spores/m3 |
| Drechslera / Bipolaris group | | Spores/m3 |
| Colorless | | Spores/m3 |
| Arthrinium | | Spores/m3 |
| Curvularia | | Spores/m3 |
| Stachybotrys | | Spores/m3 |
| Trichocladium | | Spores/m3 |
| Unknown | | Spores/m3 |
| Hyphal Elements | | Spores/m3 |
| Torula herbarum | | Spores/m3 |
| Geotrichum | | Spores/m3 |
| Epicoccum | | Spores/m3 |
| Pithomyces | | Spores/m3 |
| Chaetomium | | Spores/m3 |
| Ulocladium | | Spores/m3 |
| Rusts | | Spores/m3 |
| Clear brown | | Spores/m3 |

**TOTAL SPORES:** **22** **Spores/m3**

**Detection Limits:** 11 Spores/m3

**Date Analyzed:** 4/3/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-22 **Lab Sample Number:** 02 1899-22
**Sampling Location:** Trailer 1
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m3 |
| Ascospores | | Spores/m3 |
| Basidiospores | | Spores/m3 |
| Smuts, Periconia, Myxomycetes | | Spores/m3 |
| Penicillium/Aspergillus group | 58,533 | Spores/m3 |
| Alternaria | | Spores/m3 |
| Drechslera / Bipolaris group | | Spores/m3 |
| Colorless | | Spores/m3 |
| Arthrinium | | Spores/m3 |
| Curvularia | | Spores/m3 |
| Stachybotrys | 327 | Spores/m3 |
| Trichocladium | | Spores/m3 |
| Unknown | | Spores/m3 |
| Hyphal Elements | 654 | Spores/m3 |
| Torula herbarum | | Spores/m3 |
| Geotrichum | | Spores/m3 |
| Epicoccum | | Spores/m3 |
| Pithomyces | | Spores/m3 |
| Chaetomium | 3924 | Spores/m3 |
| Trichoderma | 43,491 | Spores/m3 |
| Rusts | | Spores/m3 |
| Clear brown | | Spores/m3 |
| **TOTAL SPORES:** | **106929** | **Spores/m3** |

**Detection Limits:** 327 Spores/m3

**Date Analyzed:** 4/4/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-23
**Lab Sample Number:** 02 1899-23
**Sampling Location:** Trailer 2
**Date Collected:** 4/2/02
**Volume/Area:** 90 L

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m3 |
| Ascospores | | Spores/m3 |
| Basidiospores | | Spores/m3 |
| Smuts, Periconia, Myxomycetes | | Spores/m3 |
| Penicillium/Aspergillus group | 1424 | Spores/m3 |
| Alternaria | | Spores/m3 |
| Drechslera / Bipolaris group | | Spores/m3 |
| Colorless | | Spores/m3 |
| Arthrinium | | Spores/m3 |
| Curvularia | | Spores/m3 |
| Stachybotrys | | Spores/m3 |
| Trichocladium | | Spores/m3 |
| Unknown | | Spores/m3 |
| Hyphal Elements | 89 | Spores/m3 |
| Torula herbarum | | Spores/m3 |
| Geotrichum | | Spores/m3 |
| Epicoccum | | Spores/m3 |
| Pithomyces | | Spores/m3 |
| Chaetomium | 359 | Spores/m3 |
| Trichoderma | 9701 | Spores/m3 |
| Rusts | | Spores/m3 |
| Clear brown | | Spores/m3 |

**TOTAL SPORES:** **11573** **Spores/m3**

**Detection Limits:** 89 Spores/m3

**Date Analyzed:** 4/4/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-24
**Lab Sample Number:** 02 1899-24
**Sampling Location:** Trailer 3
**Date Collected:** 4/2/02
**Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | 11 | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | 22 | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | 11 | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | 22 | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** **66** **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Date Analyzed:** 4/4/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-25
**Sampling Location:** Trailer 4
**Date Collected:** 4/2/02

**Lab Sample Number:** 02 1899-25
**Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | 22 | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | 242 | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | 22 | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Algae | 44 | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** **330** **Spores/m$^3$**

**Detection Limits:** 22 Spores/m$^3$

**Date Analyzed:** 4/4/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-26
**Lab Sample Number:** 02 1899-26
**Sampling Location:** Trailer 5
**Date Collected:** 4/2/02
**Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | 11 | Spores/m3 |
| Ascospores | | Spores/m3 |
| Basidiospores | | Spores/m3 |
| Smuts, Periconia, Myxomycetes | | Spores/m3 |
| Penicillium/Aspergillus group | | Spores/m3 |
| Alternaria | | Spores/m3 |
| Drechslera / Bipolaris group | | Spores/m3 |
| Colorless | | Spores/m3 |
| Arthrinium | | Spores/m3 |
| Curvularia | | Spores/m3 |
| Stachybotrys | | Spores/m3 |
| Trichocladium | | Spores/m3 |
| Unknown | 11 | Spores/m3 |
| Hyphal Elements | | Spores/m3 |
| Torula herbarum | | Spores/m3 |
| Geotrichum | | Spores/m3 |
| Epicoccum | | Spores/m3 |
| Pithomyces | | Spores/m3 |
| Chaetomium | | Spores/m3 |
| Ulocladium | | Spores/m3 |
| Rusts | | Spores/m3 |
| Clear brown | | Spores/m3 |

**TOTAL SPORES:** 22 **Spores/m3**

**Detection Limits:** 11 Spores/m3

**Date Analyzed:** 4/4/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-27
**Lab Sample Number:** 02 1899-27
**Sampling Location:** Trailer 6
**Date Collected:** 4/2/02
**Volume/Area:** 90 L

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m3 |
| Ascospores | 22 | Spores/m3 |
| Basidiospores | | Spores/m3 |
| Smuts, Periconia, Myxomycetes | | Spores/m3 |
| Penicillium/Aspergillus group | | Spores/m3 |
| Alternaria | | Spores/m3 |
| Drechslera / Bipolaris group | | Spores/m3 |
| Colorless | | Spores/m3 |
| Arthrinium | | Spores/m3 |
| Curvularia | | Spores/m3 |
| Stachybotrys | | Spores/m3 |
| Trichocladium | | Spores/m3 |
| Unknown | | Spores/m3 |
| Hyphal Elements | 22 | Spores/m3 |
| Torula herbarum | | Spores/m3 |
| Geotrichum | | Spores/m3 |
| Epicoccum | | Spores/m3 |
| Pithomyces | | Spores/m3 |
| Chaetomium | | Spores/m3 |
| Ulocladium | | Spores/m3 |
| Rusts | | Spores/m3 |
| Clear brown | | Spores/m3 |

**TOTAL SPORES:** 44 Spores/m3

**Detection Limits:** 11 Spores/m3

**Date Analyzed:** 4/4/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Attn:**
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**Date Received:** 4/3/02
**Date Reported:** 4/4/02

**Job ID:** 02 1899

**Client Sample Number:** 040202-28 **Lab Sample Number:** 02 1899-28
**Sampling Location:** Outdoor
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | 1958 | Spores/m$^3$ |
| Ascospores | 1335 | Spores/m$^3$ |
| Basidiospores | 178 | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | 356 | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | 267 | Spores/m$^3$ |
| Torula herbarum | 178 | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | 178 | Spores/m$^3$ |

**TOTAL SPORES:** **4450** **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Notes:** Moderate amount of pollen grains observed.

**Date Analyzed:** 4/4/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02

**Job ID:** 02 1899

**Client Sample Number:** 040202-29 **Lab Sample Number:** 02 1899-29
**Sampling Location:** Blank
**Date Collected:** 4/2/02 **Volume/Area:** 0 L

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m$^3$ |
| Ascospores | | Spores/m$^3$ |
| Basidiospores | | Spores/m$^3$ |
| Smuts, Periconia, Myxomycetes | | Spores/m$^3$ |
| Penicillium/Aspergillus group | | Spores/m$^3$ |
| Alternaria | | Spores/m$^3$ |
| Drechslera / Bipolaris group | | Spores/m$^3$ |
| Colorless | | Spores/m$^3$ |
| Arthrinium | | Spores/m$^3$ |
| Curvularia | | Spores/m$^3$ |
| Stachybotrys | | Spores/m$^3$ |
| Trichocladium | | Spores/m$^3$ |
| Unknown | | Spores/m$^3$ |
| Hyphal Elements | | Spores/m$^3$ |
| Torula herbarum | | Spores/m$^3$ |
| Geotrichum | | Spores/m$^3$ |
| Epicoccum | | Spores/m$^3$ |
| Pithomyces | | Spores/m$^3$ |
| Chaetomium | | Spores/m$^3$ |
| Ulocladium | | Spores/m$^3$ |
| Rusts | | Spores/m$^3$ |
| Clear brown | | Spores/m$^3$ |

**TOTAL SPORES:** **<11 Spores/m$^3$** **Spores/m$^3$**

**Detection Limits:** 11 Spores/m$^3$

**Notes:** Detection Limit = 0 when a field blank is submitted.

**Date Analyzed:** 4/4/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1899

**Client Sample Number:** 040202-30 **Lab Sample Number:** 02 1899-30
**Sampling Location:** Mrs. Lampin's Room
**Date Collected:** 4/2/02 **Volume/Area:** **90 L**

**TEST REQUESTED:** 1054 NON-VIABLE, Spore Trap Analysis

| SPORE IDENTIFICATION | RESULTS | UNITS |
|---|---|---|
| Cladosporium | | Spores/m3 |
| Ascospores | | Spores/m3 |
| Basidiospores | | Spores/m3 |
| Smuts, Periconia, Myxomycetes | | Spores/m3 |
| Penicillium/Aspergillus group | | Spores/m3 |
| Alternaria | | Spores/m3 |
| Drechslera / Bipolaris group | | Spores/m3 |
| Colorless | | Spores/m3 |
| Arthrinium | | Spores/m3 |
| Curvularia | | Spores/m3 |
| Stachybotrys | | Spores/m3 |
| Trichocladium | | Spores/m3 |
| Unknown | 11 | Spores/m3 |
| Hyphal Elements | | Spores/m3 |
| Torula herbarum | | Spores/m3 |
| Geotrichum | | Spores/m3 |
| Epicoccum | | Spores/m3 |
| Pithomyces | | Spores/m3 |
| Chaetomium | 11 | Spores/m3 |
| Nigrospora | 22 | Spores/m3 |
| Rusts | | Spores/m3 |
| Clear brown | | Spores/m3 |

**TOTAL SPORES:** **44** **Spores/m3**

**Detection Limits:** 11 Spores/m3

**Date Analyzed:** 4/4/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

# APPENDIX E

AEROBIOLOGY LABORATORY
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**Attn:**
**Project: Britton E.S.**

**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1901

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**Client Sample Number:** 25 **Lab Sample Number:** 02 1901-01
**Sampling Location:** T5 Carpet Center For All
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Moderate hyphal elements seen.
Occasional Cladosporium and Drechslera spores seen.
Occasional Epicoccum and Pithomyces spores seen.
Few algae cells seen.
Moderate amount of pollen grains observed.

**Detection Limits:** **N/A**

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **300,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 46% |
| | Epicoccum species | 30% |
| | Cladosporium species | 21% |

**Detection Limits:** **5300 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Attn:**
**Project: Britton E.S.**

**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1901

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 26 | **Lab Sample Number:** | 02 1901-02 |
| **Sampling Location:** | T6 Carpet Center Area, Near Entrance | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:**
Few pollen grains seen.
Few hyphal elements seen.
Occasional Epicoccum and Drechslera spores seen.
Occasional Pithomyces/Ulocladium group spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **330,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 47% |
| | Cladosporium species | 30% |
| | Epicoccum species | 21% |

**Detection Limits:** **6900 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Project: Britton E.S.**

**Date Received:** 4/3/02
**Date Reported:** 4/4/02
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**Job ID:** 02 1901

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 27 | **Lab Sample Number:** | 02 1901-03 |
| **Sampling Location:** | A4 Carpet by Entrance | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:**
Occasional Cladosporium and Drechslera spores seen.
Occasional Curvularia and Epicoccum spores seen.
Occasional Alternaria spores seen. Occasional ascospores seen.
Few hyphal elements seen.
Moderate amount of pollen grains observed.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **160,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 48% |
| | Sterilia mycelia | 41% |
| | Epicoccum species | 11% |

**Detection Limits:** **5600 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Date Received:** 4/3/02
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**Job ID:** 02 1901

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 28 | **Lab Sample Number:** | 02 1901-04 |
| **Sampling Location:** | A4 Carpet, Back Area, Center | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Occasional Curvularia and Epicoccum spores seen.
Few hyphal elements seen.
Occasional Drechslera spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **440,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 41% |
| | Sterilia mycelia | 37% |
| | Epicoccum species | 15% |

**Detection Limits:** **16,000 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 29 | **Lab Sample Number:** | 02 1901-05 |
| **Sampling Location:** | A5 Carpet by Entrance | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Few hyphal elements seen.
Occasional Pithomyces and Cladosporium spores seen
Moderate amount of pollen grains observed.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **310,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 42% |
| | Cladosporium species | 40% |
| | Epicoccum species | 12% |

**Detection Limits:** **6300 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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---

**Client Sample Number:** 30 **Lab Sample Number:** 02 1901-06
**Sampling Location:** A5 Carpet, Back Area, Center
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Occasional Epicoccum spores seen.
Few hyphal elements seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **830,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 43% |
| | Cladosporium species | 43% |
| | Rhodotorula species | 7% |

**Detection Limits:** **28,000 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 31 | **Lab Sample Number:** | 02 1901-07 |
| **Sampling Location:** | A7 Carpet by Entrance | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:**
1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:**
Few hyphal elements seen.
Occasional ascospores seen.
Occasional Epicoccum and Curvularia spores seen.
Occasional algae cells seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **220,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 58% |
| | Cladosporium species | 31% |
| | Epicoccum species | 11% |

**Detection Limits:** 4100 cfu/g

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 32 | **Lab Sample Number:** | 02 1901-08 |
| **Sampling Location:** | A7 Carpet, Back Area, Center | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Occasional Drechslera and Pithomyces spores seen.
Few hyphal elements seen.
Few Epicoccum spores seen.
Occasional algae cells seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: $1.1 \times 10^6$ cfu/g

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 45% |
| | Cladosporium species | 32% |
| | Epicoccum species | 23% |

**Detection Limits:** 18,000 cfu/g

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 33 | **Lab Sample Number:** | 02 1901-09 |
| **Sampling Location:** | A8 Carpet by Entrance | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Occasional Cladosporium and Pithomyces spores seen.
Few hyphal elements seen.
Occasional Epicoccum and Curvularia spores seen.
Moderate amount of pollen grains observed.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **770,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 75% |
| | Cladosporium species | 20% |
| | Epicoccum species | 5% |

**Detection Limits:** **39,000 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 34 | **Lab Sample Number:** | 02 1901-10 |
| **Sampling Location:** | A8 Carpet, Back Area, Center | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |
| **TEST REQUESTED:** | 1050 BULK, Direct Microscopic Exam<br>1033 BULK, Total FUNGAL Count w/Identifications | | |
| **Results:** | Occasional Epicoccum spores seen.<br>Few hyphal elements seen.<br>Few pollen grains seen. | | |
| **Detection Limits:** | N/A | | |
| **Date Analyzed:** | 4/4/02 | | |
| Total FUNGAL Count: | $1.9 \times 10^6$ cfu/g | | |
| FUNGUS Isolated: | Sterilia mycelia | | 53% |
| | Cladosporium species | | 35% |
| | Epicoccum species | | 12% |
| **Detection Limits:** | 110,000 cfu/g | | |
| **Date Analyzed:** | 4/9/02 | | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | | |

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**Client Sample Number:** 35 **Lab Sample Number:** 02 1901-11
**Sampling Location:** A10 Carpet by Entrance
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Occasional Epicoccum and Drechslera spores seen.
Few hyphal elements seen. Occasional ascospores seen.
Occasional Curvularia spores seen.
Occasional algae cells seen.
Moderate amount of pollen grains observed.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **330,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 41% |
| | Sterilia mycelia | 32% |
| | Epicoccum species | 17% |

**Detection Limits:** **5200 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 36 | **Lab Sample Number:** | 02 1901-12 |
| **Sampling Location:** | A10 Carpet, Back Area, Center | | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:**
Occasional Drechslera and Epicoccum spores seen.
Occasional Ulocladium and Tetraploa spores seen.
Few hyphal elements seen.
Occasional Curvularia spores seen.
Large amount of pollen grains observed.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: $1.8 \times 10^6$ cfu/g

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 57% |
| | Sterilia mycelia | 29% |
| | Epicoccum species | 14% |

**Detection Limits:** 86,000 cfu/g

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 37 **Lab Sample Number:** 02 1901-13
**Sampling Location:** A 11 Carpet by Entrance
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Occasional Epicoccum and Drechslera spores seen.
Few hyphal elements seen.
Occasional Curvularia spores seen.
Occasional algae cells seen.
Moderate amount of pollen grains observed.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **130,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 51% |
| | Cladosporium species | 36% |
| | Epicoccum species | 10% |

**Detection Limits:** **3300 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 38 **Lab Sample Number:** 02 1901-14
**Sampling Location:** A 11 Carpet, Back Area, Center
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Occasional Alternaria and Curvularia spores seen.
Moderate hyphal elements seen.
Occasional algae cells seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: $1.2 \times 10^6$ cfu/g

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 46% |
| | Cladosporium species | 31% |
| | Epicoccum species | 8% |

**Detection Limits:** 95,000 cfu/g

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 39 **Lab Sample Number:** 02 1901-15
**Sampling Location:** A13 Carpet by Entrance
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Occasional Curvularia and Epicoccum spores seen.
Few hyphal elements seen.
Occasional Pithomyces spores seen.
Moderate amount of pollen grains observed.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **610,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 69% |
| | Cladosporium species | 23% |
| | Yeast | 8% |

**Detection Limits:** **47,000 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 40 **Lab Sample Number:** 02 1901-16
**Sampling Location:** A13 Carpet, Back Area, Center
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Occasional Pithomyces and Epicoccum spores seen.
Few hyphal elements seen.
Occasional Alternaria spores seen.

**Detection Limits:** **N/A**

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **370,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 55% |
| | Cladosporium species | 25% |
| | Epicoccum species | 9% |

**Detection Limits:** **8500 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | |
|---|---|---|
| **Client Sample Number:** | 41 | **Lab Sample Number:** 02 1901-17 |
| **Sampling Location:** | A012 Carpet, Behind Reception Desk | |
| **Date Collected:** | 4/2/02 | **Volume/Area:** |
| **TEST REQUESTED:** | 1050 BULK, Direct Microscopic Exam<br>1033 BULK, Total FUNGAL Count w/Identifications | |
| **Results:** | Few pollen grains seen.<br>Occasional Epicoccum spores seen. | |
| **Detection Limits:** | **N/A** | |
| **Date Analyzed:** | 4/4/02 | |
| Total FUNGAL Count: | **590,000 cfu/g** | |
| FUNGUS Isolated: | Cladosporium species | 47% |
| | Sterilia mycelia | 28% |
| | Yeast | 14% |
| **Detection Limits:** | **16,000 cfu/g** | |
| **Date Analyzed:** | 4/9/02 | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | |

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**Client Sample Number:** 42 **Lab Sample Number:** 02 1901-18
**Sampling Location:** A012 Carpet, at Entrance to A013
**Date Collected:** 4/2/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Few hyphal elements seen.
Occasional Epicoccum spores seen.
Moderate amount of pollen grains observed.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

Total FUNGAL Count: **580,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 67% |
| | Cladosporium species | 23% |
| | Epicoccum species | 7% |

**Detection Limits:** **19,000 cfu/g**

**Date Analyzed:** 4/9/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 1 **Lab Sample Number:** 02 1908-01
**Sampling Location:** C3 Carpet, By Entrance
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:**
1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications
1075 BULK, Polyclonal Dust Mites (Der f1, Der p1)

**Results:**
Numerous pollen grains seen.
Occasional Epicoccum, Alternaria, and Curvularia spores seen.
Occasional Drechslera/Bipolaris group spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

**Results:**

| | |
|---|---|
| Low risk factor: | <15 ug/g allergen per gram house dust |
| Moderate risk factor: | 15-100 ug/g allergen per gram house dust |
| High risk for symptoms: | >100 ug/g allergen per gram house dust |

Der f1, Der p1 LEVEL: **<1.6 ug/g**

**Detection Limits:** **1.6 ug/g**

**Date Analyzed:** 4/24/02

**Analyst:** IBT

Total FUNGAL Count: **970,000 cfu/g**

FUNGUS Isolated:

| | |
|---|---|
| Sterilia mycelia | 63% |
| Cladosporium species | 37% |

**Detection Limits:** **18,000 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 2 **Lab Sample Number:** 02 1908-02
**Sampling Location:** C3 Carpet, Back Of Class, West Side
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:**
1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications
1075 BULK, Polyclonal Dust Mites (Der f1, Der p1)

**Results:**
Numerous pollen grains seen.
Occasional Epicoccum and Ulocladium spores seen.
Few hyphal elements seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

**Results:**

| | |
|---|---|
| Low risk factor: | <15 ug/g allergen per gram house dust |
| Moderate risk factor: | 15-100 ug/g allergen per gram house dust |
| High risk for symptoms: | >100 ug/g allergen per gram house dust |

Der f1, Der p1 LEVEL: **<1.6 ug/g**

**Detection Limits:** **1.6 ug/g**

**Date Analyzed:** 4/24/02

**Analyst:** IBT

Total FUNGAL Count: **570,000 cfu/g**

FUNGUS Isolated:

| | |
|---|---|
| Sterilia mycelia | 71% |
| Cladosporium species | 21% |
| Epicoccum species | 8% |

**Detection Limits:** **44,000 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 3 **Lab Sample Number:** 02 1908-03
**Sampling Location:** C1 Carpet By Entrance
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Few Ulocladium spores seen. Moderate pollen grains seen.
Occasional basidiospores seen.
Occasional Drechslera/Bipolaris group spores seen.
Occasional Curvularia spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **49,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 80% |
| | Cladosporium species | 13% |
| | Aspergillus niger | 3% |

**Detection Limits:** **1600 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 4 **Lab Sample Number:** 02 1908-04
**Sampling Location:** C1 Carpet, Back Area, Center
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Moderate pollen grains seen.
Occasional Curvularia, Epicoccum, and Cladosporium spores seen.
Occasional Drechslera/Bipolaris group spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **190,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 89% |
| | Cladosporium species | 8% |
| | Epicoccum species | 3% |

**Detection Limits:** 5000 cfu/g

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 5 | **Lab Sample Number:** | 02 1908-05 |
| **Sampling Location:** | C2 Carpet By Entrance | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen. Occasional algae cells seen.
Occasional Drechslera/Bipolaris group spores seen.
Occasional Ulocladium and Epicoccum spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **190,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 85% |
| | Cladosporium species | 8% |
| | Drechslera / Bipolaris group | 7% |

**Detection Limits:** **15,000 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 6 **Lab Sample Number:** 02 1908-06
**Sampling Location:** C2 Carpet, Back Area, Center
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen.
Occasional Curvularia spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **100,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 94% |
| | Cladosporium species | 6% |

**Detection Limits:** **6300 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 7 | **Lab Sample Number:** | 02 1908-07 |
| **Sampling Location:** | C4 Carpet By Entrance | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |
| **TEST REQUESTED:** | 1050 BULK, Direct Microscopic Exam<br>1033 BULK, Total FUNGAL Count w/Identifications | | |
| **Results:** | Numerous pollen grains seen.<br>Occasional Drechslera/Bipolaris group spores seen.<br>Occasional hyphal elements seen. | | |
| **Detection Limits:** | N/A | | |
| **Date Analyzed:** | 4/4/02 | | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | | |
| Total FUNGAL Count: | **30,000 cfu/g** | | |
| FUNGUS Isolated: | Sterilia mycelia | | 89% |
| | Cladosporium species | | 11% |
| **Detection Limits:** | **1800 cfu/g** | | |
| **Date Analyzed:** | 4/10/02 | | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 8 | **Lab Sample Number:** | 02 1908-08 |
| **Sampling Location:** | C4 Carpet, Back Area, West Center | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen. Occasional ascospores seen.
Occasional Ulocladium spores seen.
Occasional hyphal elements seen.
Occasional Drechslera/Bipolaris group spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **730,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 68% |
| | Cladosporium species | 21% |
| | Epicoccum species | 11% |

**Detection Limits:** **38,000 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 9 | **Lab Sample Number:** | 02 1908-09 |
| **Sampling Location:** | C6 Carpet By Entrance | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:**
Moderate pollen grains seen.
Occasional Drechslera/Bipolaris group spores seen.
Occasional algae cells seen.
Occasional Epicoccum spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **72,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 66% |
| | Cladosporium species | 22% |
| | Epicoccum species | 7% |

**Detection Limits:** **1800 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 10 **Lab Sample Number:** 02 1908-10
**Sampling Location:** C6 Carpet , Back Area, Center
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen.
Occasional Epicoccum spores seen.
Occasional hyphal elements and basidiospores seen.
Occasional Drechslera/Bipolaris group spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **300,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 63% |
| | Cladosporium species | 27% |
| | Epicoccum species | 5% |

**Detection Limits:** 5000 cfu/g

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | |
|---|---|---|
| **Client Sample Number:** | 11 | **Lab Sample Number:** 02 1908-11 |
| **Sampling Location:** | C12 Carpet By Entrance | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** |
| **TEST REQUESTED:** | 1050 BULK, Direct Microscopic Exam<br>1033 BULK, Total FUNGAL Count w/Identifications | |
| **Results:** | Numerous pollen grains seen.<br>Occasional Epicoccum, Ulocladium, and Curvularia spores seen.<br>Occasional Drechslera/Bipolaris group spores seen. | |
| **Detection Limits:** | N/A | |
| **Date Analyzed:** | 4/4/02 | |
| **Analyst:** | Debra Gulick, B.S., MT (ASCP) | |
| Total FUNGAL Count: | **340,000 cfu/g** | |
| FUNGUS Isolated: | Sterilia mycelia | 68% |
| | Cladosporium species | 23% |
| | Penicillium species | 6% |
| **Detection Limits:** | **11,000 cfu/g** | |
| **Date Analyzed:** | 4/10/02 | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | |

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 12 | **Lab Sample Number:** | 02 1908-12 |
| **Sampling Location:** | C12 Carpet, Back Area, Center | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen. Occasional hyphal elements and basidiospores seen. Occasional Cladosporium, Epicoccum, and Pestalotiopsis spores seen.
Occasional Drechslera/Bipolaris group spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

| | | |
|---|---|---|
| Total FUNGAL Count: | $2.9 \times 10^6$ cfu/g | |
| FUNGUS Isolated: | Cladosporium species | 53% |
| | Sterilia mycelia | 40% |
| | Epicoccum species | 5% |
| **Detection Limits:** | 48,000 cfu/g | |
| **Date Analyzed:** | 4/10/02 | |
| **Analyst:** | Patricia R. Vestal, M.S., SM (ASCP) | |

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**Client Sample Number:** 13 **Lab Sample Number:** 02 1908-13
**Sampling Location:** B6, Carpet By Entrance
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:**
1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications
1075 BULK, Polyclonal Dust Mites (Der f1, Der p1)

**Results:**
Moderate pollen grains seen.
Occasional ascospores seen.
Occasional Curvularia and colorless spores seen.
Occasional Drechslera/Bipolaris group spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

**Results:**

| | |
|---|---|
| Low risk factor: | <15 ug/g allergen per gram house dust |
| Moderate risk factor: | 15-100 ug/g allergen per gram house dust |
| High risk for symptoms: | >100 ug/g allergen per gram house dust |

Der f1, Der p1 LEVEL: **<1.6 ug/g**

**Detection Limits:** **1.6 ug/g**

**Date Analyzed:** 4/24/02

**Analyst:** IBT

Total FUNGAL Count: **190,000 cfu/g**

FUNGUS Isolated:

| | |
|---|---|
| Cladosporium species | 43% |
| Sterilia mycelia | 43% |
| Epicoccum species | 11% |
| Aspergillus niger | 1% |

**Detection Limits:** **1400 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 14 **Lab Sample Number:** 02 1908-14
**Sampling Location:** B6 Carpet, Back Of Room, East Side
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:**
1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications
1075 BULK, Polyclonal Dust Mites (Der f1, Der p1)

**Results:**
Numerous pollen grains seen. Occasional basidiospores seen.
Occasional Curvularia, Alternaria, Epicoccum, Pithomyces,
and Cladosporium spores seen.
Occasional Drechslera/Bipolaris group spores seen.

**Detection Limits:** **N/A**

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

**Results:**
Low risk factor: <15 ug/g allergen per gram house dust
Moderate risk factor: 15-100 ug/g allergen per gram house dust
High risk for symptoms: >100 ug/g allergen per gram house dust

Der f1, Der p1 LEVEL: **<1.6 ug/g**

**Detection Limits:** **1.6 ug/g**

**Date Analyzed:** 4/24/02

**Analyst:** IBT

Total FUNGAL Count: **3.1x10⁶ cfu/g**

FUNGUS Isolated:

| | |
|---|---|
| Cladosporium species | 87% |
| Sterilia mycelia | 7% |
| Epicoccum species | 4% |

**Detection Limits:** **56,000 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 15 | **Lab Sample Number:** | 02 1908-15 |
| **Sampling Location:** | B5 Carpet By Entrance | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:**
1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:**
Numerous pollen grains seen.
Occasional rusts and ascospores seen.
Occasional Curvularia and Pithomyces spores seen.
Occasional Drechslera/Bipolaris group spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **150,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Cladosporium species | 53% |
| | Sterilia mycelia | 29% |
| | Epicoccum species | 17% |

**Detection Limits:** **1500 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 16 | **Lab Sample Number:** | 02 1908-16 |
| **Sampling Location:** | B5 Carpet, Back Of Room, Center | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen.
Occasional Drechslera/Bipolaris group spores seen.
Occasional Pithomyces and Curvularia spores seen.
Few hyphal elements seen.

**Detection Limits:** **N/A**

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **610,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 62% |
| | Cladosporium species | 24% |
| | Epicoccum species | 12% |

**Detection Limits:** **11,000 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 17 | **Lab Sample Number:** | 02 1908-17 |
| **Sampling Location:** | B8 Carpet By Entrance | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen.
Occasional Drechslera/Bipolaris group spores seen.
Few hyphal elements seen. Occasional algae cells seen.
Occasional Ulocladium spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **120,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 51% |
| | Cladosporium species | 31% |
| | Epicoccum species | 14% |

**Detection Limits:** **1700 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 18 | **Lab Sample Number:** | 02 1908-18 |
| **Sampling Location:** | B8 Carpet, Back Area, Center | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:**
1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:**
Moderate pollen grains seen.
Occasional ascospores seen.
Occasional Epicoccum spores seen.
Occasional Drechslera/Bipolaris group spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: $1.3 \times 10^6$ cfu/g

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 49% |
| | Cladosporium species | 33% |
| | Epicoccum species | 18% |

**Detection Limits:** 34,000 cfu/g

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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**Client Sample Number:** 19 **Lab Sample Number:** 02 1908-19
**Sampling Location:** B12 Carpet By Entrance
**Date Collected:** 4/1/02 **Volume/Area:**

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen.
Occasional Epicoccum spores seen.
Occasional Drechslera/Bipolaris group spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **560,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 58% |
| | Cladosporium species | 32% |
| | Epicoccum species | 6% |

**Detection Limits:** **18,000 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 20 | **Lab Sample Number:** | 02 1908-20 |
| **Sampling Location:** | B12 Carpet, Back Area, Center | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Moderate pollen grains seen.
Occasional Curvularia, Epicoccum, and Cladosporium spores seen.
Occasional algae cells seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **250,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 48% |
| | Cladosporium species | 36% |
| | Epicoccum species | 12% |

**Detection Limits:** **4300 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 21 | **Lab Sample Number:** | 02 1908-21 |
| **Sampling Location:** | T2 Carpet Center | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen.
Occasional Drechslera/Bipolaris group spores seen.
Few hyphal elements seen.
Few Epicoccum spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **250,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 78% |
| | Cladosporium species | 11% |
| | Epicoccum species | 6% |

**Detection Limits:** **14,000 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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| | | | |
|---|---|---|---|
| **Client Sample Number:** | 22 | **Lab Sample Number:** | 02 1908-22 |
| **Sampling Location:** | T1 Carpet Center | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Moderate pollen grains seen. Occasional algae cells, and hyphal elements seen.
Few Epicoccum and Curvularia spores seen.
Occasional Pithomyces spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **130,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 42% |
| | Cladosporium species | 39% |
| | Epicoccum species | 12% |

**Detection Limits:** **2400 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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# Certificate of Laboratory Analysis

**Michael Baker Corp.**
**420 Rouser Rd. Airport Office Park Bldg 3**
**Corapolis, PA 15108**
**Attn:**
**Project: Brittin E. S.**

**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 23 of 24**
**Job ID:** 02 1908

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 23 | **Lab Sample Number:** | 02 1908-23 |
| **Sampling Location:** | T4 Carpet Center | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen.
Occasional Cladosporium spores seen.

**Detection Limits:** N/A

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **210,000 cfu/g**

| FUNGUS Isolated: | | |
|---|---|---|
| | Sterilia mycelia | 67% |
| | Cladosporium species | 20% |
| | Epicoccum species | 13% |

**Detection Limits:** **14,000 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

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MICROBIOLOGY SPECIALISTS

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**Michael Baker Corp.**
**420 Rouser Rd. Airport Office Park Bldg 3**
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**Date Received:** 4/3/02
**Date Reported:** 4/4/02
**Page 24 of 24**
**Job ID:** 02 1908

| | | | |
|---|---|---|---|
| **Client Sample Number:** | 24 | **Lab Sample Number:** | 02 1908-24 |
| **Sampling Location:** | T3 Carpet Center | | |
| **Date Collected:** | 4/1/02 | **Volume/Area:** | |

**TEST REQUESTED:** 1050 BULK, Direct Microscopic Exam
1033 BULK, Total FUNGAL Count w/Identifications

**Results:** Numerous pollen grains seen.
Occasional Curvularia and Epicoccum spores seen.
Occasional Drechslera/Bipolaris group spores seen.
Occasional hyphal elements seen.

**Detection Limits:** **N/A**

**Date Analyzed:** 4/4/02

**Analyst:** Debra Gulick, B.S., MT (ASCP)

Total FUNGAL Count: **550,000 cfu/g**

| | | |
|---|---|---|
| FUNGUS Isolated: | Cladosporium species | 59% |
| | Sterilia mycelia | 24% |
| | Epicoccum species | 14% |

**Detection Limits:** **6500 cfu/g**

**Date Analyzed:** 4/10/02

**Analyst:** Patricia R. Vestal, M.S., SM (ASCP)

# APPENDIX F

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ASSOCIATES, INCORPORATED
MICROBIOLOGY SPECIALISTS
Website: www.iaqlab.com
11800 Sunrise Valley Drive., Suite 1250, Reston, VA 20191 (703) 648-9150 Fax (703) 648-3919 email: aerobiolab1 @ earthlink.net
102F Woodwinds Industrial Ct., Cary, NC 27511 (919) 463-0522 Fax (919) 463-0527 email: aerobio @ bellsouth.net



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New York City Department of Health
Bureau of Environmental & Occupational Disease Epidemiology

**Guidelines on Assessment and Remediation of Fungi in Indoor Environments**



## Executive Summary

On May 7, 1993, the New York City Department of Health (DOH), the New York City Human Resources Administration (HRA), and the Mt. Sinai Occupational Health Clinic convened an expert panel on *Stachybotrys atra* in Indoor Environments. The purpose of the panel was to develop policies for medical and environmental evaluation and intervention to address *Stachybotrys atra* (now known as *Stachybotrys chartarum* (SC)) contamination. The original guidelines were developed because of mold growth problems in several New York City buildings in the early 1990's. This document revises and expands the original guidelines to include all fungi (mold). It is based both on a review of the literature regarding fungi and on comments obtained by a review panel consisting of experts in the fields of microbiology and health sciences. It is intended for use by building engineers and management, but is available for general distribution to anyone concerned about fungal contamination, such as environmental consultants, health professionals, or the general public.

We are expanding the guidelines to be inclusive of all fungi for several reasons:

- Many fungi (e.g., species of *Aspergillus, Penicillium, Fusarium, Trichoderma,* and *Memnoniella*) in addition to SC can produce potent mycotoxins, some of which are identical to compounds produced by SC. Mycotoxins are fungal metabolites that have been identified as toxic agents. For this reason, SC cannot be treated as uniquely toxic in indoor environments.

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ASSOCIATES, INCORPORATED
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Website: www.iaqlab.com
11800 Sunrise Valley Drive., Suite 1250, Reston, VA 20191 (703) 648-9150 Fax (703) 648-3919 email: aerobiolabl@earthlink.net
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- People performing renovations/cleaning of widespread fungal contamination may be at risk for developing Organic Dust Toxic Syndrome (ODTS) or Hypersensitivity Pneumonitis (HP). ODTS may occur after a *single heavy* exposure to dust contaminated with fungi and produces flu-like symptoms. It differs from HP in that it is not an immune-mediated disease and does not require repeated exposures to the same causative agent. A variety of biological agents may cause ODTS including common species of fungi. HP may occur after repeated exposures to an allergen and can result in permanent lung damage.

- Fungi can cause allergic reactions. The most common symptoms are runny nose, eye irritation, cough, congestion, and aggravation of asthma.

Fungi are present almost everywhere in indoor and outdoor environments. The most common symptoms of fungal exposure are runny nose, eye irritation, cough, congestion, and aggravation of asthma. Although there is evidence documenting severe health effects of fungi in humans, most of this evidence is derived from ingestion of contaminated foods (i.e., grain and peanut products) or occupational exposures in agricultural settings where inhalation exposures were very high. With the possible exception of remediation to very heavily contaminated indoor environments, such high-level exposures are not expected to occur while performing remedial work.

There have been reports linking health effects in office workers to offices contaminated with moldy surfaces and residents of homes contaminated with fungal growth. Symptoms, such as fatigue, respiratory ailments, and eye irritation were typically observed in these cases. Some studies have suggested an association between SC and pulmonary hemorrhage/hemosiderosis in infants, generally those less than six months old. Pulmonary hemosiderosis is an uncommon condition that results from bleeding in the lungs. The cause of this condition is unknown, but may result from a combination of environmental contaminants and conditions (e.g., smoking, fungal contaminants and other bioaerosols, and water-damaged homes), and currently its association with SC is unproven.

The focus of this guidance document addresses mold contamination of building components (walls, ventilation systems, support beams, etc.) that are chronically moist or water damaged. Occupants should address common household sources of mold, such as mold found in bathroom tubs or between tiles with household cleaners. Moldy food (e.g., breads, fruits, etc.) should be discarded.

Building materials supporting fungal growth must be remediated *as rapidly as possible* in order to ensure a healthy environment. Repair of the defects that led to water accumulation (or elevated humidity) should be conducted in conjunction with or prior to fungal remediation. Specific methods of assessing and remediating fungal contamination should be based on the extent of visible contamination and underlying damage. The simplest and most expedient remediation that is reasonable, and properly and safely removes fungal contamination, should be used. Remediation and assessment methods are described in this document.

The use of respiratory protection, gloves, and eye protection is recommended. Extensive contamination, particularly if heating, ventilating, air conditioning (HVAC) systems or large occupied spaces are involved, should be assessed by an experienced health and safety professional and remediated by personnel with training and experience handling environmentally contaminated materials. Lesser areas of contamination can usually be assessed and remediated by building maintenance personnel. In order to prevent contamination from recurring,

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ASSOCIATES, INCORPORATED
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underlying defects causing moisture buildup and water damage must be addressed. Effective communication with building occupants is an essential component of all remedial efforts.

Fungi in buildings may cause or exacerbate symptoms of allergies (such as wheezing, chest tightness, shortness of breath, nasal congestion, and eye irritation), especially in persons who have a history of allergic diseases (such as asthma and rhinitis). Individuals with persistent health problems that appear to be related to fungi or other bioaerosol exposure should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures. Decisions about removing individuals from an affected area must be based on the results of such medical evaluation, and be made on a case-by-case basis. Except in cases of widespread fungal contamination that are linked to illnesses throughout a building, building-wide evacuation is not indicated.

In summary, prompt remediation of contaminated material and infrastructure repair is the primary response to fungal contamination in buildings. Emphasis should be placed on preventing contamination through proper building and HVAC system maintenance and prompt repair of water damage.

This document is not a legal mandate and should be used as a guideline. Currently there are no United States Federal, New York State, or New York City regulations for evaluating potential health effects of fungal contamination and remediation. These guidelines are subject to change as more information regarding fungal contaminants becomes available.

## Introduction

On May 7, 1993, the New York City Department of Health (DOH), the New York City Human Resources Administration (HRA), and the Mt. Sinai Occupational Health Clinic convened an expert panel on *Stachybotrys atra* in Indoor Environments. The purpose of the panel was to develop policies for medical and environmental evaluation and intervention to address *Stachybotrys atra* (now known as *Stachybotrys chartarum* (SC)) contamination. The original guidelines were developed because of mold growth problems in several New York City buildings in the early 1990's. This document revises and expands the original guidelines to include all fungi (mold). It is based both on a review of the literature regarding fungi and on comments obtained by a review panel consisting of experts in the fields of microbiology and health sciences. It is intended for use by building engineers and management, but is available for general distribution to anyone concerned about fungal contamination, such as environmental consultants, health professionals, or the general public.

This document contains a discussion of potential health effects; medical evaluations; environmental assessments; protocols for remediation; and a discussion of risk communication strategy. The guidelines are divided into four sections:

1. Health Issues; 2. Environmental Assessment; 3. Remediation; and 4. Hazard Communication.

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MICROBIOLOGY SPECIALISTS
Website: www.iaqlab.com
11800 Sunrise Valley Drive., Suite 1250. Reston, VA 20191 (703) 648-9150 Fax (703) 648-3919 email: aerobiolab1 @ earthlink.net
102F Woodwinds Industrial Ct., Cary, NC 27511 (919) 463-0522 Fax (919) 463-0527 email: aerobio @ bellsouth.net

We are expanding the guidelines to be inclusive of all fungi for several reasons:

- Many fungi (e.g., species of *Aspergillus, Penicillium, Fusarium, Trichoderma,* and *Memnoniella*) in addition to SC can produce potent mycotoxins, some of which are identical to compounds produced by SC.[1,2,3,4] Mycotoxins are fungal metabolites that have been identified as toxic agents. For this reason, SC cannot be treated as uniquely toxic in indoor environments.

- People performing renovations/cleaning of widespread fungal contamination may be at risk for developing Organic Dust Toxic Syndrome (ODTS) or Hypersensitivity Pneumonitis (HP). ODTS may occur after a *single heavy* exposure to dust contaminated with fungi and produces flu-like symptoms. It differs from HP in that it is not an immune-mediated disease and does not require repeated exposures to the same causative agent. A variety of biological agents may cause ODTS including common species of fungi. HP may occur after repeated exposures to an allergen and can result in permanent lung damage.[5,6,7,8,9,10]

- Fungi can cause allergic reactions. The most common symptoms are runny nose, eye irritation, cough, congestion, and aggravation of asthma.[11,12]

Fungi are present almost everywhere in indoor and outdoor environments. The most common symptoms of fungal exposure are runny nose, eye irritation, cough, congestion, and aggravation of asthma. Although there is evidence documenting severe health effects of fungi in humans, most of this evidence is derived from ingestion of contaminated foods (i.e., grain and peanut products) or occupational exposures in agricultural settings where inhalation exposures were very high.[13,14] With the possible exception of remediation to very heavily contaminated indoor environments, such high level exposures are not expected to occur while performing remedial work.[15]

There have been reports linking health effects in office workers to offices contaminated with moldy surfaces and in residents of homes contaminated with fungal growth.[12,16,17,18,19,20] Symptoms, such as fatigue, respiratory ailments, and eye irritation were typically observed in these cases.

Some studies have suggested an association between SC and pulmonary hemorrhage/hemosiderosis in infants, generally those less than six months old. Pulmonary hemosiderosis is an uncommon condition that results from bleeding in the lungs. The cause of this condition is unknown, but may result from a combination of environmental contaminants and conditions (e.g., smoking, other microbial contaminants, and water-damaged homes), and currently its association with SC is unproven.[21,22,23]

The focus of this guidance document addresses mold contamination of building components (walls, ventilation systems, support beams, etc.) that are chronically moist or water damaged. Occupants should address common household sources of mold, such as mold found in bathroom tubs or between tiles with household cleaners. Moldy food (e.g., breads, fruits, etc.) should be discarded.

This document is not a legal mandate and should be used as a guideline. Currently there are no United States Federal, New York State, or New York City regulations for evaluating potential health effects of fungal contamination and remediation. These guidelines are subject to change as more information regarding fungal contaminants becomes available.

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102F Woodwinds Industrial Ct., Cary, NC 27511 (919) 463-0522 Fax (919) 463-0527 email: aerobio @ bellsouth.net

# 1. Health Issues

## 1.1 Health Effects

Inhalation of fungal spores, fragments (parts), or metabolites (e.g., mycotoxins and volatile organic compounds) from a wide variety of fungi may lead to or exacerbate immunologic (allergic) reactions, cause toxic effects, or cause infections.[11, 12, 24]

There are only a limited number of documented cases of health problems from indoor exposure to fungi. The intensity of exposure and health effects seen in studies of fungal exposure in the indoor environment was typically much less severe than those that were experienced by agricultural workers but were of a long-term duration.[5-10, 12, 14, 16-20, 25-27] Illnesses can result from both high level, short-term exposures and lower level, long-term exposures. The most common symptoms reported from exposures in indoor environments are runny nose, eye irritation, cough, congestion, aggravation of asthma, headache, and fatigue.[11, 12, 16-20]

The presence of fungi on building materials as identified by a visual assessment or by bulk/surface sampling results does not necessitate that people will be exposed or exhibit health effects. In order for humans to be exposed indoors, fungal spores, fragments, or metabolites must be released into the air and inhaled, physically contacted (dermal exposure), or ingested. Whether or not symptoms develop in people exposed to fungi depends on the nature of the fungal material (e.g., allergenic, toxic, or infectious), the amount of exposure, and the susceptibility of exposed persons. Susceptibility varies with the genetic predisposition (e.g., allergic reactions do not always occur in all individuals), age, state of health, and concurrent exposures. For these reasons, and because measurements of exposure are not standardized and biological markers of exposure to fungi are largely unknown, it is not possible to determine "safe" or "unsafe" levels of exposure for people in general.

### 1.1.1 Immunological Effects

Immunological reactions include asthma, HP, and allergic rhinitis. Contact with fungi may also lead to dermatitis. It is thought that these conditions are caused by an immune response to fungal agents. The most common symptoms associated with allergic reactions are runny nose, eye irritation, cough, congestion, and aggravation of asthma.[11, 12] HP may occur after repeated exposures to an allergen and can result in permanent lung damage. HP has typically been associated with repeated heavy exposures in agricultural settings but has also been reported in office settings.[25, 26, 27] Exposure to fungi through renovation work may also lead to initiation or exacerbation of allergic or respiratory symptoms.

### 1.1.2 Toxic Effects

A wide variety of symptoms have been attributed to the toxic effects of fungi. Symptoms, such as fatigue, nausea, and headaches, and respiratory and eye irritation have been reported. Some of the symptoms related to fungal exposure are non-specific, such as discomfort, inability to concentrate, and fatigue.[11, 12, 16-20] Severe illnesses such as ODTS and pulmonary hemosiderosis have also been attributed to fungal exposures.[5-10, 21, 22]

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11800 Sunrise Valley Drive., Suite 1250. Reston, VA 20191 (703) 648-9150 Fax (703) 648-3919 email: aerobiolab1 @ earthlink.net
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ODTS describes the abrupt onset of fever, flu-like symptoms, and respiratory symptoms in the hours following a *single, heavy* exposure to dust containing organic material including fungi. It differs from HP in that it is not an immune-mediated disease and does not require repeated exposures to the same causative agent. ODTS may be caused by a variety of biological agents including common species of fungi (e.g., species of *Aspergillus* and *Penicillium*). ODTS has been documented in farm workers handling contaminated material but is also of concern to workers performing renovation work on building materials contaminated with fungi.[5-10]

Some studies have suggested an association between SC and pulmonary hemorrhage/hemosiderosis in infants, generally those less than six months old. Pulmonary hemosiderosis is an uncommon condition that results from bleeding in the lungs. The cause of this condition is unknown, but may result from a combination of environmental contaminants and conditions (e.g., smoking, fungal contaminants and other bioaerosols, and water-damaged homes), and currently its association with SC is unproven.[21, 22, 23]

### 1.1.3 Infectious Disease

Only a small group of fungi have been associated with infectious disease. Aspergillosis is an infectious disease that can occur in immunosuppressed persons. Health effects in this population can be severe. Several species of *Aspergillus* are known to cause aspergillosis. The most common is *Aspergillus fumigatus*. Exposure to this common mold, even to high concentrations, is unlikely to cause infection in a healthy person.[11, 24]

Exposure to fungi associated with bird and bat droppings (e.g., *Histoplasma capsulatum* and *Cryptococcus neoformans*) can lead to health effects, usually transient flu-like illnesses, in healthy individuals. Severe health effects are primarily encountered in immunocompromised persons.[24, 28, 29]

### 1.2 Medical Evaluation

Individuals with persistent health problems that appear to be related to fungi or other bioaerosol exposure should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures. Infants (less than 12 months old) who are experiencing non-traumatic nosebleeds or are residing in dwellings with damp or moldy conditions and are experiencing breathing difficulties should receive a medical evaluation to screen for alveolar hemorrhage. Following this evaluation, infants who are suspected of having alveolar hemorrhaging should be referred to a pediatric pulmonologist. Infants diagnosed with pulmonary hemosiderosis and/or pulmonary hemorrhaging should not be returned to dwellings until remediation and air testing are completed.

Clinical tests that can determine the source, place, or time of exposure to fungi or their products are not currently available. Antibodies developed by exposed persons to fungal agents can only document that exposure has occurred. Since exposure to fungi routinely occurs in both outdoor and indoor environments this information is of limited value.

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Website: www.iaqlab.com
11800 Sunrise Valley Drive., Suite 1250, Reston, VA 20191 (703) 648-9150 Fax (703) 648-3919 email: aerobiolabl @earthlink.net
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### 1.3 Medical Relocation

Infants (less than 12 months old), persons recovering from recent surgery, or people with immune suppression, asthma, hypersensitivity pneumonitis, severe allergies, sinusitis, or other chronic inflammatory lung diseases may be at greater risk for developing health problems associated with certain fungi. Such persons should be removed from the affected area during remediation (see Section 3, Remediation). Persons diagnosed with fungal related diseases should not be returned to the affected areas until remediation and air testing are completed.

Except in cases of widespread fungal contamination that are linked to illnesses throughout a building, a building-wide evacuation is not indicated. A trained occupational/environmental health practitioner should base decisions about medical removals in the occupational setting on the results of a clinical assessment.

## 2. Environmental Assessment

The presence of mold, water damage, or musty odors should be addressed immediately. In all instances, any source(s) of water must be stopped and the extent of water damaged determined. Water damaged materials should be dried and repaired. Mold damaged materials should be remediated in accordance with this document (see Section 3, Remediation).

### 2.1 Visual Inspection

A visual inspection is the most important initial step in identifying a possible contamination problem. The extent of any water damage and mold growth should be visually assessed. This assessment is important in determining remedial strategies. Ventilation systems should also be visually checked, particularly for damp filters but also for damp conditions elsewhere in the system and overall cleanliness. Ceiling tiles, gypsum wallboard (sheetrock), cardboard, paper, and other cellulosic surfaces should be given careful attention during a visual inspection. The use of equipment such as a boroscope, to view spaces in ductwork or behind walls, or a moisture meter, to detect moisture in building materials, may be helpful in identifying hidden sources of fungal growth and the extent of water damage.

### 2.2 Bulk/Surface Sampling

a. Bulk or surface sampling is not required to undertake a remediation. Remediation (as described in Section 3, Remediation) of visually identified fungal contamination should proceed without further evaluation.

b. Bulk or surface samples may need to be collected to identify specific fungal contaminants as part of a medical evaluation if occupants are experiencing symptoms which may be related to fungal exposure or to identify the presence or absence of mold if a visual inspection is equivocal (e.g., discoloration, and staining).

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c. An individual trained in appropriate sampling methodology should perform bulk or surface sampling. Bulk samples are usually collected from visibly moldy surfaces by scraping or cutting materials with a clean tool into a clean plastic bag. Surface samples are usually collected by wiping a measured area with a sterile swab or by stripping the suspect surface with clear tape. Surface sampling is less destructive than bulk sampling. Other sampling methods may also be available. A laboratory specializing in mycology should be consulted for specific sampling and delivery instructions.

## 2.3 Air Monitoring

d. Air sampling for fungi should not be part of a routine assessment. This is because decisions about appropriate remediation strategies can usually be made on the basis of a visual inspection. In addition, air-sampling methods for some fungi are prone to false negative results and therefore cannot be used to definitively rule out contamination.

e. Air monitoring may be necessary if an individual(s) has been diagnosed with a disease that is or may be associated with a fungal exposure (e.g., pulmonary hemorrhage/hemosiderosis, and aspergillosis).

f. Air monitoring may be necessary if there is evidence from a visual inspection or bulk sampling that ventilation systems may be contaminated. The purpose of such air monitoring is to assess the extent of contamination throughout a building. It is preferable to conduct sampling while ventilation systems are operating.

g. Air monitoring may be necessary if the presence of mold is suspected (e.g., musty odors) but cannot be identified by a visual inspection or bulk sampling (e.g., mold growth behind walls). The purpose of such air monitoring is to determine the location and/or extent of contamination.

h. If air monitoring is performed, for comparative purposes, outdoor air samples should be collected concurrently at an air intake, if possible, and at a location representative of outdoor air. For additional information on air sampling, refer to the American Conference of Governmental Industrial Hygienists' document, "Bioaerosols: Assessment and Control."

i. Personnel conducting the sampling must be trained in proper air sampling methods for microbial contaminants. A laboratory specializing in mycology should be consulted for specific sampling and shipping instructions.

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### 2.4 Analysis of Environmental Samples

Microscopic identification of the spores/colonies requires considerable expertise. These services are not routinely available from commercial laboratories. Documented quality control in the laboratories used for analysis of the bulk/surface and air samples is necessary. The American Industrial Hygiene Association (AIHA) offers accreditation to microbial laboratories (Environmental Microbiology Laboratory Accreditation Program (EMLAP)). Accredited laboratories must participate in quarterly proficiency testing (Environmental Microbiology Proficiency Analytical Testing Program (EMPAT)).

Evaluation of bulk/surface and air sampling data should be performed by an experienced health professional. The presence of few or trace amounts of fungal spores in bulk/surface sampling should be considered background. Amounts greater than this or the presence of fungal fragments (e.g., hyphae, and conidiophores) may suggest fungal colonization, growth, and/or accumulation at or near the sampled location.[30] Air samples should be evaluated by means of comparison (i.e., indoors to outdoors) and by fungal type (e.g., genera, and species). In general, the levels and types of fungi found should be similar indoors (in non-problem buildings) as compared to the outdoor air. Differences in the levels or types of fungi found in air samples may indicate that moisture sources and resultant fungal growth may be problematic.

## 3. Remediation

**In all situations, the underlying cause of water accumulation must be rectified or fungal growth will recur.** Any initial water infiltration should be stopped and cleaned immediately. An immediate response (within 24 to 48 hours) and thorough clean up, drying, and/or removal of water damaged materials will prevent or limit mold growth. If the source of water is elevated humidity, relative humidity should be maintained at levels below 60% to inhibit mold growth.[31] Emphasis should be on ensuring proper repairs of the building infrastructure, so that water damage and moisture buildup does not recur.

Five different levels of abatement are described below. The size of the area impacted by fungal contamination primarily determines the type of remediation. The sizing levels below are based on professional judgement and practicality; currently there is not adequate data to relate the extent of contamination to frequency or severity of health effects. **The goal of remediation is to remove or clean contaminated materials in a way that prevents the emission of fungi and dust contaminated with fungi from leaving a work area and entering an occupied or non-abatement area, while protecting the health of workers performing the abatement.** The listed remediation methods were designed to achieve this goal, however, due to the general nature of these methods it is the responsibility of the people conducting remediation to ensure the methods enacted are adequate. The listed remediation methods are not meant to exclude other similarly effective methods. Any changes to the remediation methods listed in these guidelines, however, should be carefully considered prior to implementation.

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Non-porous (e.g., metals, glass, and hard plastics) and semi-porous (e.g., wood, and concrete) materials that are structurally sound and are visibly moldy can be cleaned and reused. Cleaning should be done using a detergent solution. Porous materials such as ceiling tiles and insulation, and wallboards with more than a small area of contamination should be removed and discarded. Porous materials (e.g., wallboard, and fabrics) that can be cleaned, can be reused, but should be discarded if possible. A professional restoration consultant should be contacted when restoring porous materials with more than a small area of fungal contamination. All materials to be reused should be dry and visibly free from mold. Routine inspections should be conducted to confirm the effectiveness of remediation work.

The use of gaseous ozone or chlorine dioxide for remedial purposes is **not** recommended. Both compounds are highly toxic and contamination of occupied space may pose a health threat. Furthermore, the effectiveness of these treatments is unproven. For additional information on the use of biocides for remedial purposes, refer to the American Conference of Governmental Industrial Hygienists' document, "Bioaerosols: Assessment and Control."

**3.1 *Level I*: Small Isolated Areas** (10 sq. ft or less) - e.g., ceiling tiles, small areas on walls

a. Remediation can be conducted by regular building maintenance staff. Such persons should receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

b. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.

c. The work area should be unoccupied. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons recovering from recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

d. Containment of the work area is not necessary. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.

e. Contaminated materials that cannot be cleaned should be removed from the building in a sealed plastic bag. There are no special requirements for the disposal of moldy materials.

f. The work area and areas used by remedial workers for egress should be cleaned with a damp cloth and/or mop and a detergent solution.

g. All areas should be left dry and visibly free from contamination and debris.

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ASSOCIATES, INCORPORATED
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Website: www.iaqlab.com
11800 Sunrise Valley Drive., Suite 1250, Reston, VA 20191 (703) 648-9150 Fax (703) 648-3919 email: aerobiolab1@earthlink.net
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3.2 *Level II*: **Mid-Sized Isolated Areas** (10 - 30 sq. ft.) - e.g., individual wallboard panels.

h. Remediation can be conducted by regular building maintenance staff. Such persons should receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

i. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.

j. The work area should be unoccupied. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

k. The work area should be covered with a plastic sheet(s) and sealed with tape before remediation, to contain dust/debris.

l. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.

m. Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. There are no special requirements for the disposal of moldy materials.

n. The work area and areas used by remedial workers for egress should be HEPA vacuumed (a vacuum equipped with a High-Efficiency Particulate Air filter) and cleaned with a damp cloth and/or mop and a detergent solution.

o. All areas should be left dry and visibly free from contamination and debris.

3.3 *Level III*: **Large Isolated Areas** (30 - 100 square feet) - e.g., several wallboard panels.

A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for the project.

The following procedures *at a minimum* are recommended:

p. Personnel trained in the handling of hazardous materials and equipped with respiratory protection, (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.

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q. The work area and areas directly adjacent should be covered with a plastic sheet(s) and taped before remediation, to contain dust/debris.

r. Seal ventilation ducts/grills in the work area and areas directly adjacent with plastic sheeting.

s. The work area and areas directly adjacent should be unoccupied. Further vacating of people from spaces near the work area is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

t. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.

u. Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. There are no special requirements for the disposal of moldy materials.

v. The work area and surrounding areas should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution.

w. All areas should be left dry and visibly free from contamination and debris.

If abatement procedures are expected to generate a lot of dust (e.g., abrasive cleaning of contaminated surfaces, demolition of plaster walls) or the visible concentration of the fungi is heavy (blanket coverage as opposed to patchy), then it is recommended that the remediation procedures for Level IV are followed.

### 3.4 *Level IV*: Extensive Contamination (greater than 100 contiguous square feet in an area)

A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for the project. The following procedures are recommended:

x. Personnel trained in the handling of hazardous materials equipped with:

   i. Full-face respirators with high efficiency particulate air (HEPA) cartridges

   ii. Disposable protective clothing covering both head and shoes

   iii. Gloves

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y. Containment of the affected area:

   i. Complete isolation of work area from occupied spaces using plastic sheeting sealed with duct tape (including ventilation ducts/grills, fixtures, and any other openings)

   ii. The use of an exhaust fan with a HEPA filter to generate negative pressurization

   iii. Airlocks and decontamination room

z. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

aa. Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. The outside of the bags should be cleaned with a damp cloth and a detergent solution or HEPA vacuumed in the decontamination chamber prior to their transport to uncontaminated areas of the building. There are no special requirements for the disposal of moldy materials.

bb. The contained area and decontamination room should be HEPA vacuumed and cleaned with a damp cloth and/or mop with a detergent solution and be visibly clean prior to the removal of isolation barriers.

cc. Air monitoring should be conducted prior to occupancy to determine if the area is fit to reoccupy.

### 3.5 *Level V*: Remediation of HVAC Systems

#### 3.5.1 A Small Isolated Area of Contamination (<10 square feet) in the HVAC System

dd. Remediation can be conducted by regular building maintenance staff. Such persons should receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

ee. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.

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ff. The HVAC system should be shut down prior to any remedial activities.

gg. The work area should be covered with a plastic sheet(s) and sealed with tape before remediation, to contain dust/debris.

hh. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.

ii. Growth supporting materials that are contaminated, such as the paper on the insulation of interior lined ducts and filters, should be removed. Other contaminated materials that cannot be cleaned should be removed in sealed plastic bags. There are no special requirements for the disposal of moldy materials.

jj. The work area and areas immediately surrounding the work area should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution.

kk. All areas should be left dry and visibly free from contamination and debris.

ll. A variety of biocides are recommended by HVAC manufacturers for use with HVAC components, such as, cooling coils and condensation pans. HVAC manufacturers should be consulted for the products they recommend for use in their systems.

### 3.5.2 Areas of Contamination (>10 square feet) in the HVAC System

A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for remediation projects involving more than a small isolated area in an HVAC system. The following procedures are recommended:

mm. Personnel trained in the handling of hazardous materials equipped with:

i. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended.

ii. Gloves and eye protection

iii. Full-face respirators with HEPA cartridges and disposable protective clothing covering both head and shoes should be worn if contamination is greater than 30 square feet.

nn. The HVAC system should be shut down prior to any remedial activities.

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oo. Containment of the affected area:

i. Complete isolation of work area from the other areas of the HVAC system using plastic sheeting sealed with duct tape.

ii. The use of an exhaust fan with a HEPA filter to generate negative pressurization.

iii. Airlocks and decontamination room if contamination is greater than 30 square feet.

pp. Growth supporting materials that are contaminated, such as the paper on the insulation of interior lined ducts and filters, should be removed. Other contaminated materials that cannot be cleaned should be removed in sealed plastic bags. When a decontamination chamber is present, the outside of the bags should be cleaned with a damp cloth and a detergent solution or HEPA vacuumed prior to their transport to uncontaminated areas of the building. There are no special requirements for the disposal of moldy materials.

qq. The contained area and decontamination room should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution prior to the removal of isolation barriers.

rr. All areas should be left dry and visibly free from contamination and debris.

ss. Air monitoring should be conducted prior to re-occupancy with the HVAC system in operation to determine if the area(s) served by the system are fit to reoccupy.

tt. A variety of biocides are recommended by HVAC manufacturers for use with HVAC components, such as, cooling coils and condensation pans. HVAC manufacturers should be consulted for the products they recommend for use in their systems.

**4. Hazard Communication**

When fungal growth requiring large-scale remediation is found, the building owner, management, and/or employer should notify occupants in the affected area(s) of its presence. Notification should include a description of the remedial measures to be taken and a timetable for completion. Group meetings held before and after remediation with full disclosure of plans and results can be an effective communication mechanism. Individuals with persistent health problems that appear to be related to bioaerosol exposure should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures. Individuals seeking medical attention should be provided with a copy of all inspection results and interpretation to give to their medical practitioners.

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## Conclusion

In summary, the prompt remediation of contaminated material and infrastructure repair must be the primary response to fungal contamination in buildings. The simplest and most expedient remediation that properly and safely removes fungal growth from buildings should be used. In all situations, the underlying cause of water accumulation must be rectified or the fungal growth will recur. Emphasis should be placed on preventing contamination through proper building maintenance and prompt repair of water damaged areas.

Widespread contamination poses much larger problems that must be addressed on a case-by-case basis in consultation with a health and safety specialist. Effective communication with building occupants is an essential component of all remedial efforts. Individuals with persistent health problems should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures.

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11800 Sunrise Valley Drive., Suite 1250, Reston, VA 20191 (703) 648-9150 Fax (703) 648-3919 email: aerobiolab1 @ earthlink.net
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102F Woodwinds Industrial Ct., Cary, NC 27511 (919) 463-0522 Fax (919) 463-0527 email: acrobio @ bellsouth.net

| | |
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For further information regarding this document please contact the New York City Department of Health at (212) 788-4290.

*(April 2000) November 2000*

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# APPENDIX G

| | |
|---|---|
| liter of air (pCi/l) | -probably not required |
| >4 pCi/l | follow-up measurements should be performed. |

**AIRBORNE PARTICULATES**

Use a particle counting instrument capable of measuring concentrations as low as 2000 particles/cubic centimeter (cc) of air for comparing particulates in various areas. The investigator may be able to determine where additional ventilation or air filtration is necessary to eliminate or minimize employee complaints.

For example, if employee complaints are more prevalent in an area where the particulate concentration is 40,000 particles/cc., and other areas are below 15,000 particles/cc., the investigator may recommend that a high efficiency filter be installed or, if the area has a separate ventilation system, that the ventilation rate be increased.

**AIRBORNE MICROORGANISMS**

The ACGIH5 recommends a preassessment of the extent of microbial contamination prior to initiation of air sampling. Airborne microbials sampling equipment is available from the HRT if sampling is necessary.

Before biological sampling, several precautions must be taken including making arrangements for preparing culture media for sampling, specialized shipping procedures, and making arrangements for analysis by a laboratory familiar with the handling and processing of biological samples. Contact the Directorate of Technical Support for information about laboratories experienced in the analysis of microbial samples and with knowledge of the health effects.

Legionella pneumophila is often present in hot water tanks, washing systems and pools of stagnant water but health effects are not observed until the contaminants become aerosolized within the building confinements.

The identification of predominant taxa, or at least fungi, is recommended in addition to determining the number of colony-forming units/m(3) of air (cfu/m(3)). During growing seasons, outdoor fungus-spore levels can range from 1000-100,000 cfu/m(3) of air.

Contamination indicators:(9)

* 1000 viable colony-forming units in a cubic meter of air,
* 1,000,000 fungi per gram of dust or material, and
* 100,000 bacteria or fungi per milliliter of stagnant water or slime.

Levels in excess of the above do not necessarily imply that the conditions are unsafe or hazardous. The type and concentrations of the airborne microorganisms will determine the hazard to employees.

**MISCELLANEOUS AIRBORNE CONTAMINANTS**

Use a portable infrared spectrometer to evaluate a wide variety of potential air contaminants including acetic acid, ammonia, carbon dioxide, carbon monoxide, nitric oxide, nitrogen dioxide, sulfur dioxide, and a number of volatile organic compounds. It can be connected to a strip

# APPENDIX H

# Identification and Engineering Solutions of HVAC Microbial Contamination in the State of Minnesota

Paul J. Ellringer, P.E., CIH - 612/696-0267, fax 612/698-3487, E-mail paulje@ix.netcom.com - Tamarack Environmental Consultants, 1640 Scheffer Ave., St. Paul, Minnesota 55116. April 1996

## Table of Contents



## Introduction

For the past five years, the State of Minnesota has become very concerned with indoor air quality concerns in state owned and leased buildings. State agencies are in custodial control of about 2,000 state owned and 1,000 state leased office type buildings in Minnesota, including most of the higher educational facilities in the state. More than 100,000 office occupants are in these buildings.

Occupants in many of these buildings have been complaining of fatigue, headaches, sinus infections, respiratory infections, and stale air. Many only experience these symptoms when in

| Table 5 - Building C - Dry Bulk Sample Results * | | |
|---|---|---|
| Location - Date Collected | CFU/G | Type (%) |
| Same as 4 and 4A - 3/9/95 | 1,500 | Penicillium (67)<br>Bacteria (33) |
| 9th Floor VAV box North of Elevators - internal fibrous glass liner about 40 feet downstream of cooling coils - 3/9/95. | 26,500 | Basidiomycetes (4)<br>Cladosporium (74)<br>Penicillium (10)<br>Bacteria (12) |

# - sample number. Location-Date Collected - The sample collection site is described first followed by the date the sample was collected. CFU/g - Colony Forming Units per gram of material collected. Type (%) - Types of organisms and the percentages of each found. < - less than values mean the levels were below the detection limit. n.a. - not applicable, because no organisms were detected.

## tate of Minnesota Microbial Guidelines

oaerosols - A screening range for fungal bioaerosols in **office buildings** has been used by the innesota Department of Employee Relation, Employee Insurance Division, Safety and Industrial ygiene Unit. These guidelines were developed based on numerous bioaerosol studies conducted **office buildings** in Minnesota. The ranges which follow should only be used when samples are ken using a three-piece 37 mm cassette with a 0.8 um pore size MCE filter (old style asbestos ttes) with a flow rate of 3 - 4 LPM, total sample volume 300 - 400 liters, with the samples llected open face with the filter cassette in the breathing zone of office workers (sampling ocedures similar to sampling for asbestos fibers). Sampling should occur during the normal work urs of the occupants with the occupants present performing normal work activities. Most ofessionals would consider this type of sampling to be semi-aggressive sampling.

e indoor concentrations of bioaerosols in the spring, summer and fall are normally less than the tdoor concentrations. Typically the bioaerosols are of the same type indoors and outdoors with ew exceptions. During the winter, bioaerosol levels will be lower both indoors and outdoors, but biggest changes occur outdoors when under some conditions the concentrations can be zero. In spring, summer and fall the concentrations of bioaerosols outdoors and indoors, varies greatly l in most cases the concentrations outdoors (and types of organisms) are 5 to 10 times higher then concentrations indoors(There typically are a greater variety of organisms outdoors).

ien evaluating an office building for bioaerosols, an outdoor reference sample must always be en at the same time that indoor samples are taken. This outdoor sample becomes the reference which the indoor samples are measured against.

ur unit has concerns when the indoor concentrations of bioaerosols are:

more than 25 colony forming units (CFU) per $m^3$ of fungi from indoor sources, if there is only one species present.
up to 50 CFU per $m^3$ of fungi from indoor sources should be considered acceptable if there is a mixture of species
up to 100 CFU per $m^3$ of fungi from indoor sources should be considered acceptable if dominated by Cladosporium or other common phylloplane fungi.

he above numbers should be used only when outdoor reference concentrations are at or below ,000 CFU/$m^3$. These numbers should be adjusted upwards in relation to outdoor concentrations. or example, if outdoor concentrations are 2,000 CFU/m3, these numbers should be doubled. The ypes of organisms present are very important when evaluating samples.

When the bioaerosols present indoors are the same organisms as are present outdoors but the levels re above 100 CFU/$m^3$, we believe the building's ventilation system is not filtering the outdoor air roperly.

f the bioaerosols present indoors are different and/or the same but at concentrations above ½ outdoor concentrations and especially if at higher concentrations then the bioaerosols outdoors, it indicates that these organisms are likely growing somewhere inside the building. The types of bioaerosols present indoors are very important in making the decision as to whether these organisms present a concern to the building occupants or not. Organisms of special concern include potential opportunistic human pathogens (Aspergillus etc.), toxigenic fungi (Stachybotrys atra) and organisms ich have been associated with hypersensitivity pneumonitis (Penicillium, Alternaria etc.). If opportunistic or toxigenic fungi are detected in the samples, critical result analysis is required. If the frequency of these fungi is low (actual counts on the filter are at or below 2 CFU/filter, concentrations below 5 - 8 CFU/$m^3$), repeat sampling should be considered to determine whether these fungi are transitional. If these fungi are at elevated concentrations or consistently identified from samples, the source of these organisms needs to be determined.

Always remember that many factors or variables affect the results and individual responses. Professional experience and judgement should be used with on-site observations to interpret the results.

Wipe Sample Guidelines - general guidelines for fungus wet wipe samples are that less than 1,000 CFU/sq. cm (colony forming units per square centimeter) are within the normal range; 1,000 - 2,000 are considered borderline. Fungus levels more than 2,000 CFU/sq. cm have the potential of significantly contributing to airborne populations. The quantity and types of microbes need to be considered when making this determination. If a large number of different types of organisms are present, greater than 5, and one to three of these organisms are not present in large numbers, it is likely that these organisms could have been deposited in this location rather than the microbes actively growing in a location. On the other hand, if less than three organisms are present, and 1 or

2 of these are present in large numbers, then the microbes are likely growing in a location.

Certain organisms like Aspergillus, Penicillium and Stachybotrys need attention at relatively low concentrations. Levels above 1,000 CFU/sq. cm, when Aspergillus, Penicillium or Alternaria is the predominate organisms is of concern.

Bacteria need to be treated separately from fungi and it is difficult to get meaningful results. Presently guidelines for bacteria wipe samples have not been developed. Bacteria like a wet environment and high levels of bacteria typically indicate that high relative humidity (70% plus)/condensation or liquid water was recently present in a location.

Dry Bulk Sample Guidelines - Bulk materials, such as carpet fibers, ceiling tiles, wall materials, fibrous glass insulation, accumulated dusts, etc., should be sampled and analyzed. This is another approach to locate sources of microbial amplifications. "Clean" and "suspect" materials should be taken for comparison purposes. Compare microbial concentrations and types of microbes identified. Similar comparative approaches, as in wipe samples, should be used to determine if microorganisms are growing in the materials or accumulated as dusts.

The general guidelines for fungus dry bulk samples are that less than 10,000 CFU/G (Colony Forming Units per gram of dust) are within the normal range; 10,000 - 100,000 CFU/G is considered borderline. Microbial fungus levels more than 100,000 CFU/G has the potential of significantly contributing to airborne populations. The quantity and types of microbes need to be considered when making this determination. If a large number of different types of organisms are present, greater than 5, and one to three of these organisms are not present in large numbers, it is likely that these organisms could have been deposited in this location rather than the microbes actively growing in a location. On the other hand, if less than three organisms are present, and 1 or 2 of these are present in large numbers, then the microbes are likely growing in a location. Certain organisms like Aspergillus, Penicillium and Stachybotrys need attention at relatively low concentrations. Levels above 5,000 CFU/G when Aspergillus, Penicillium or Alternaria is the predominate organisms is of concern.

Bacteria need to be treated separately from fungus and are very difficult to get meaningful results because the types of bacteria are not normally known. Rough general guidelines on bacteria are that levels less than 100,000 CFU/G are commonly found, 100,000 - 1,000,000 are borderline and levels more than 1,000,000 should be considered to have the potential of significantly contributing to airborne populations. Bacteria like a wet environment and high levels of bacteria typically indicate that high relative humidity (70% plus)/condensation or liquid water was recently present in a location.

# APPENDIX I

# CURRICULUM VITAE
# SUZANNE SNISCAK BLEVINS, B.S., ASCP(SM)

**PERSONAL:**


Address: 4303 Woodward Court
Chantilly, Virginia 20151
phone: 703-266-1912
FAX: 703-266-6887
email: sblevins@cox.rr.com


**EDUCATION:**

B.S. Biology, Virginia Tech. 1976.
George Mason University: Post Graduate Courses In Environmental Sciences

**CERTIFICATIONS:**

ASCP (SM): American Society of Clinical Pathology, Specialist in Microbiology

**EXPERIENCE:**

**January 1999 to Present** — **Aerobiology Laboratory Associates, Inc.**
**11800 Sunrise Valley Drive, Suite 1250**
**Reston, Va. 20191**
**703-648-9150**

Position: CEO, Laboratory Director

**April 1997 – Dec 1998** — **Applied Environmental, Inc.**
11800 Sunrise Valley Drive, Suite 1200
Reston, VA 20191

Position: Director, Aerobiology Laboratory Division

Responsibilities:
Provide technical assistance and sampling services for IAQ testing protocols/and IAQ investigations
Air, surface, bulk and water analysis for bacteria and fungus
Specialize in Burkard and Allergenco non-viable spore trap analysis
Develop and maintain a large, diverse nationwide client base
Develop new assays and services in Aerobiology
Participatation in AIHA EMPAT

| | |
|---|---|
| **July 1994 - March 1997** | **HP Environmental, Inc.**<br>104 Elden Street<br>Herndon, Virginia 22070 |
| Position: | Supervisor, Environmental Microbiology Lab |
| Responsibilities: | Provide technical assistance and analytical expertise for IAQ testing<br>IAQ site investigations<br>Developed and maintained a large, diverse nationwide client base<br>Analysis of environmental samples for bacteria and fungus<br>Specialized in Burkard non-viable spore analysis<br>Responsible for SOP's and training of technicians<br>Managed all phases of microbiology laboratory<br>Develop new assays and services in Aerobiology<br>Participation in AIHA EMPAT |
| **October 1976 - July 1994** | **American Medical Laboratories, Inc.**<br>P.O. Box 10841<br>Chantilly, Virginia 20151 |
| Position: | Technical Supervisor, Microbiology |
| Responsibilities: | Selection and supervision of department personnel<br>Prepare annual budget for Microbiology Dept<br>Monitor cost per test/revenue ratio<br>Provide technical interpretation of clinical and environmental analysis<br>Implementation of new test methods |
| Position: | Bench Supervisor, Microbiology |
| Responsibilities: | Validation studies for new test systems<br>Direct supervision of personnel<br>Conducted yearly employee performance reviews<br>Maintain technical expertise in all areas of Micro: bacteriology, mycology, mycobacteriology, parasitology and environmental microbiology<br>Monitored quality assurance |

| | |
|---|---|
| Position: | Senior Technologist, Microbiology |
| Responsibilities: | Develop expertise in specialty areas of mycology, parasitology, mycobacteriology and environmental microbiology<br>Training of new employees and medical technology students<br>Cross training of technologists/technician |
| Position: | Technologist, Microbiology |
| Responsibilities: | All general procedures in general microbiology: blood, wound, urine, TB, stool, and urogenital cultures; gram stain and acid fast stains<br>Routine serology procedures; IFA/FA |

**CONTINUING EDUCATION:**

Introduction to Food and Air-Borne Fungi: Centraalbureau voor Schimmelcultures(Netherlands)/Eastern Cereal and Oilseed Research Centre(Canada): 06/01
Pathogenic Species of Fusarium, Acremonium and Tricoderma: Identification, Ecology and
Pathogenic Species of Fusarium, Acremonium and Tricoderma: Identification, Ecology and Molecular Development : National Laboratory Training Network 05/01
Aspergillus Identification: National Laboratory Training Network 04/01
Penicillium Identification: National Laboratory Training Network 04/00
McCrone Research Institute "Introduction to Non-Biological Particles" May 2000
Medically Significant Mycotoxigenic Fungi: National Laboratory Training Network 5/98
Non-viable training course at Environmental Microbiology Laboratory 10/96
Advanced Aerobiology sponsored by Pan American Aerobiology Society and University of Montreal 7/96
Biological Contamination of Indoor Environments: Mid Atlantic Training Center and EPA Region 9 3/96
Laboratory Identification of Emerging Pathogens from Clinical and EnvironmentalLaboratory
Identification of Emerging Pathogens from Clinical and Environmental Sources (National Laboratory Training Network) 9/95
US Public Health Service - Division of Federal Occupational Health: Fungi and Bacteria in Indoor Air Environments: Health Effects, Detection and Remediation 9/94
American Academy of Allergy, Asthma and Immunology: Aeroallergen Identification Course 3/94
University of Michigan: Bioaerosols: Health Effects, Exposure Assessment and Control 10/92 & 10/90
American Society of Testing and Materials: Biological Contaminants of Indoor Environments 7/89

PROFESSIONAL ORGANIZATIONS

American Industrial Hygiene Association
American Society of Testing and Materials
American Society of Microbiology
American College of Clinical Pathologists
International Aerobiology Association
Pan American Aerobiology Association
Mycological Society of the Americas

ATTACHMENT

B

Baker

*Baker and Associates*

# ATTACHMENT B

## *Additional Sample Results*

# SCHNEIDER LABORATORIES

**INCORPORATED**

2512 W. Cary Street • Richmond, Virginia • 23220-5117

804-353-6778 • 800-785-LABS (5227) • (FAX) 804-353-6928


***Excellence in Service and Technology***

**AIHA 8936, ELLAP 8936, NVLAP 1150, NYELAP 11413, CAELAP 2078, NC 593, SC 93003**

## LABORATORY ANALYSIS REPORT

Formaldehyde-SKC Analysis by NIOSH 2016 Method

| | | | |
|---|---|---|---|
| **ACCOUNT #:** | 1929-02-253 | **DATE COLLECTED:** | 04/2/2002 |
| **CLIENT:** | Baker Environmental | **DATE RECEIVED:** | 04/3/2002 |
| **ADDRESS:** | 420 Rouser Road, Airport Office Park Bld | **DATE ANALYZED:** | 04/3/2002 |
| | Coraopolis PA 15108 | **DATE REPORTED:** | 04/4/2002 |
| **PO NO.:** | | | |
| **PROJECT NAME:** | BRITTIN ES Follow-up | | |
| **PROJECT NO.:** | 23970-011-0001-00002 | | |
| **JOB LOCATION:** | Ft. Stewart, GA | **MEDIA TYPE:** | SKC BADGE |

| SLI Sample No. | Client Sample No. | Sample Time (min) | Flow Rate (L/min) | Sample Volume (L) | Total HCHO (mg)* | Actual Exp ($mg/m^3$)* | 8 Hour TWA ($mg/m^3$)* | Actual Exp (PPM) | 8 Hour TWA (PPM) | Report Limit (mg)** |
|---|---|---|---|---|---|---|---|---|---|---|
| 2230173 | 663242 | 456 | 0.029 | 13.04 | 0.0004 | 0.0307 | 0.0291 | 0.0250 | 0.0237 | 0.0004 |
| 2230174 | 663246 | 472 | 0.029 | 13.50 | 0.0005 | 0.0370 | 0.0364 | 0.0302 | 0.0297 | 0.0004 |
| 2230175 | 663280 | 450 | 0.029 | 12.87 | 0.0004 | 0.0311 | 0.0291 | 0.0253 | 0.0237 | 0.0004 |
| 2230176 | 663847 | 451 | 0.029 | 12.90 | < 0.0004 | < 0.0310 | < 0.0291 | < 0.0252 | < 0.0237 | 0.0004 |
| 2230177 | 663881 | 448 | 0.029 | 12.81 | < 0.0004 | < 0.0312 | < 0.0291 | < 0.0254 | < 0.0237 | 0.0004 |
| 2230178 | 663880 | 447 | 0.029 | 12.78 | < 0.0004 | < 0.0313 | < 0.0291 | < 0.0255 | < 0.0237 | 0.0004 |
| 2230179 | 663236 | 446 | 0.029 | 12.76 | < 0.0004 | < 0.0314 | < 0.0291 | < 0.0255 | < 0.0237 | 0.0004 |
| 2230180 | 663873 | 442 | 0.029 | 12.64 | < 0.0004 | < 0.0316 | < 0.0291 | < 0.0258 | < 0.0237 | 0.0004 |
| 2230181 | 663263 | 441 | 0.029 | 12.61 | < 0.0004 | < 0.0317 | < 0.0291 | < 0.0258 | < 0.0237 | 0.0004 |
| 2230182 | 663234 | 438 | 0.029 | 12.53 | < 0.0004 | < 0.0319 | < 0.0291 | < 0.0260 | < 0.0237 | 0.0004 |
| 2230183 | 663939 | 437 | 0.029 | 12.50 | < 0.0004 | < 0.0320 | < 0.0291 | < 0.0261 | < 0.0237 | 0.0004 |
| 2230184 | 663865 | 435 | 0.029 | 12.44 | < 0.0004 | < 0.0322 | < 0.0291 | < 0.0262 | < 0.0237 | 0.0004 |
| 2230185 | 663248 | 435 | 0.029 | 12.44 | < 0.0004 | < 0.0322 | < 0.0291 | < 0.0262 | < 0.0237 | 0.0004 |
| 2230186 | 663893 | 433 | 0.029 | 12.38 | 0.0004 | 0.0323 | 0.0291 | 0.0263 | 0.0237 | 0.0004 |
| 2230187 | 663958 | 432 | 0.029 | 12.36 | < 0.0004 | < 0.0324 | < 0.0291 | < 0.0264 | < 0.0237 | 0.0004 |
| 2230188 | 663918 | 427 | 0.029 | 12.21 | < 0.0004 | < 0.0328 | < 0.0291 | < 0.0267 | < 0.0237 | 0.0004 |
| 2230189 | 663896 | 414 | 0.029 | 11.84 | 0.0004 | 0.0338 | 0.0291 | 0.0275 | 0.0237 | 0.0004 |

| | | | |
|---|---|---|---|
| QC | Laboratory Blank | < 0.0004 | |
| QC | Spike 1 - 0.008 mg | 0.0079 | 99.0% |
| QC | Spike 2 - 0.008 mg | 0.0078 | 98.0% |
| QC | Spike 3 - 0.008 mg | 0.0081 | 101.0% |

**ANALYST: BERNARD H. HOWARD**

**REVIEWED BY**

OSHA Permissible Exposure Limit (PEL) for Formaldehyde-SKC is 0.92 $mg/m^3$ [0.75 PPM ] for 8 hour TWA.

* For true values assume two (2) significant figures.

** Reporting Limit represents the lowest reportable concentration of the tested substance.

Exposure calculations are based on client-supplied information and assume zero exposure for time not sampled.

Standard and spike values are reported as percent recovery for Quality Control purposes.

All testing is performed in strict accordance with Schneider Laboratories, Inc. protocol.

# SCHNEIDER LABORATORIES

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## LABORATORY ANALYSIS REPORT

Asbestos and Other Fibers Counted By NIOSH 7400 Method, Issue 2, Aug. 12, 1994

**ACCOUNT:** 1929-02-254
**CLIENT:** Baker Environmental
**ADDRESS:** 420 Rouser Road, Airport Office Park Bld
Coraopolis, PA 15108
**PO NO.:**
**PROJECT NAME:** Brittin ES Follow-Up
**PROJECT NO.:** 23970-011-001-00002
**JOB LOCATION:** Ft. Stewart, GA

**DATE COLLECTED:** 4/ 2/2002
**DATE RECEIVED:** 4/ 8/2002
**DATE ANALYZED:** 4/ 9/2002
**DATE REPORTED:** 4/ 9/2002
**RESPIRATOR:**

Area and Environmental Samples

| SLI Sample No. | Client Sample No. | Sample Identification | Sample Date | Flow Rate (L/min) | Sample Time (min) | Sample Volume (L) | Fiber Count (f/field) | Actual Exposure (f/cc) |
|---|---|---|---|---|---|---|---|---|
| 2233819 | 85996 | C3-Center | 4/ 2/2002 | 2.40 | 348 | 836.9 | < 0.055 | < 0.003 |
| 2233820 | 85997 | C2-Center | 4/ 2/2002 | 2.29 | 349 | 797.4 | < 0.055 | < 0.003 |
| 2233821 | 85998 | C12-Center | 4/ 2/2002 | 2.22 | 363 | 807.6 | < 0.055 | < 0.003 |
| 2233822 | 85995 | B6-Center | 4/ 2/2002 | 2.31 | 347 | 799.8 | < 0.055 | < 0.003 |
| 2233823 | 85999 | B5-Center | 4/ 3/2002 | 2.40 | 260 | 624.0 | < 0.055 | < 0.004 |
| 2233824 | 86000 | B12- Back Center | 4/ 3/2002 | 2.28 | 261 | 593.7 | < 0.055 | < 0.005 |
| 2233825 | 86001 | A4-Back Center | 4/ 3/2002 | 2.30 | 261 | 600.3 | < 0.055 | < 0.004 |
| 2233826 | 86002 | A7-Center | 4/ 3/2002 | 2.28 | 261 | 595.0 | < 0.055 | < 0.005 |
| 2233827 | 86003 | A11-Center | 4/ 3/2002 | 2.39 | 183 | 437.3 | < 0.055 | < 0.006 |
| 2233828 | 86004 | Blank | 4/ 3/2002 | 0.00 | 0 | 0.0 | < 0.055 | |
| 2233829 | 86005 | Blank | 4/ 3/2002 | 0.00 | 0 | 0.0 | < 0.055 | |

**ANALYST: MELISSA M. KANODE**
**Total no. of pages in report = 1**

Jean M Mayes
**REVIEWED BY** **JEAN L. MAYES**

*OSHA PEL is 0.1 f/cc for 8h TWA. Method limit: 0.01 f/cc.*
*Exposure calculations are based on client-supplied information. 8 hour TWAs assume zero exposure for time not sampled.*
*Microscopic field area ($mm^2$): 0.00785. Estimated limit of detection: 7 $f/mm^2$.*
*Estimated relative standard deviations: Intra-Laboratory: ± 0.29; Inter-Laboratory: ± 0.38.*