



# PROTECTION HOME INSPECTION LLC



Forrest (Butch) Sutherland  
750 Fox Creek

CINCINNATI, OHIO 45245-1153

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Residential Evaluation & Mechanical Introduction  
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Angie's list

## Microbiology Sampling Report

Date : October 26, 2011

Client:

John Doe

3025 Your Way

Any Where, Ky 41005

Project address 3025 Next Hill

Lab Number: 161119469

Project Name: Next Hill

Project Number: 20111027m

Test Date: October 26, 2011

### *Scope and Background*

Protection Home Inspection was hired to perform air sampling, at the above address. Mold was noted on the floor joist and band boards by a home inspector. With the concern of mold types and health issues, the buyer requested air sampling of the home.

**Observations: The home was vacant and appeared neat and clean. The HVAC system was running and a dehumidifier was in the basement. a mold like substance was seen on the floor joist, and band board, in the utility room area and a small amount in the laundry area.**

Present: Forrest Sutherland.

Molds, also known as fungi, are microscopic organisms that can be found virtually everywhere, indoors and outdoors. In the presence of excess moisture, mold can grow rapidly to produce adverse conditions. In response to increasing public concern, a number of authorities, including the United States EPA, California Department of Health services and New York City Department of health, have developed recommendations and guidelines for assessment and remediation of mold.

While it is generally accepted that molds can be allergenic, infectious and toxic, there are no generally accepted numerical guidelines for interpretation of microbial data. The absence of standards makes interpretation of microbial data somewhat challenging. This report has been designed to provide some basic interpretive information using certain

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assumptions and facts that have been extracted from a number of authoritative bodies and peer reviewed text, Such as the American Conference of Governmental Industrial Hygienists (ACGIH). In absents of standards, I must determine the testing conditions, appropriateness and applicability of this report to a given situation. Weather, temperature, relative humidity, and dew points, in relationship with the index sample and other samples made must be taken in consideration along with debris ratings.

I also cannot assume the quality or the responsibility that is assumed by any remediation company. I subscribe to the IICRC S520 and would expect that any remediation company would apply these standards and practices in the remediation of any and all properties.

Often mold and air sampling is limited by a monetary decision determined by the client.

## Ambient Air Areas Tested:

- 1) An air sample was taken at the exterior to identify the mold present and the levels of the molds.
- 2) An air sample was taken to identify any elevated levels of mold at the first floor
- 3) An air sample was taken to identify any elevated molds in the basement.
- 4) A tape lift was taken of the mold present in the basement on the floor joist.

### Test results and Conclusions:

The air sample test results identify elevated molds in the basement and slightly elevated in the 1st floor.

See the mold Glossary in the lab report for Aspergillum/Penicillium .

### Remediation Recommendations:

First –Establish a Containment area as prescribed by IICRC S520. Remediation should be preformed to the Standard and Reference Guide for the Professional mold remediation IICRC S520. Certified mold personal should be employed.

- 1) Control the temperature in the property by use of the ,or a HVAC system
- 2) Control and reduce the humidity in the home to 25-30%. This is best preformed by installing dehumidifiers on the 1<sup>st</sup> . Also a dehumidifiers should be installed in the basement. Continue to run these units until the remediation process is complete, and then install a permanent system on the HVAC system.

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- 3) Establish HEPA air filter systems on the 1<sup>st</sup> floor, along with a unit or even two units in the basement. This depends on the size and volume of the units CFM. These systems should exit the home and establish a negative air pressure on the building envelope.
  - 4) All pose items (carpet, furniture moisture stained drywall should be removed from the building., These items must be double bagged (plastic) and sealed, before removal from the house. Clean the HVAC System and all its components.
  - 5) Wet wipe and HEPPA VAC all areas of the basement.
  - 6) Any dry wall or wall coverings in the basement should be removed 18" beyond the infected area.
  - 7) Any exposed timbers should be wet wiped and sealed with a biocide. (clear or white)
  - 8) Equip all personnel with latex gloves and N95 Respirator.
  - 9) All remediation personal should be IICRC certified for the job they are performing.
- Always refer to the IICRC S 520 for additional steps.

Recommendations: Dehumidifier should be present in the basement area. It is also important to heat and cool the basement.

### **Schedule post remediation air sampling to assure the remediation has been properly preformed.**

**All Remediation equipment should be turned off 12-24 Hrs prior to post testing. The equipment must be covered and sealed to prevent contamination of the areas with its own mold spores.**

Concern about indoor exposure to mold has been increasing as the public becomes aware that exposure to mold can cause a variety of health effects and symptoms, including allergic reactions. This document presents guidelines for the remediation/cleanup of mold and moisture problems in facilities at NC State University including measures designed to protect the health of building occupants and remediators.

Mold can be found almost anywhere; it can grow on virtually any organic substance, as long as moisture and oxygen are present. There is mold that can grow on wood, paper, carpet, foods, and insulation. When excessive moisture accumulates in buildings or on building materials, mold growth will often occur, particularly if the moisture problem remains undiscovered or unaddressed. It is impossible to eliminate all molds and mold

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spores in the indoor environment. However, mold growth can be controlled indoors by controlling moisture indoors.

Since mold requires water to grow, it is important to prevent moisture problems in buildings. Moisture problems can have many causes, including uncontrolled humidity. Some moisture problems in buildings have been linked to changes in building construction practices during the 1970s, 80s, and 90s. Some of these changes have resulted in buildings that are tightly sealed, but may lack adequate ventilation, potentially leading to moisture buildup. Building materials, such as drywall, may not allow moisture to escape easily. Moisture problems may include roof leaks, landscaping or gutters that direct water into or under the building, and unvented combustion appliances. Delayed maintenance or insufficient maintenance is also associated with moisture problems in schools and large buildings. Moisture problems in portable classrooms and other temporary structures have frequently been associated with mold problems.

## Prevention

- Fix leaky plumbing and leaks in the building envelope as soon as possible.
- Watch for condensation and wet spots. Fix source(s) of moisture problem(s) as soon as possible.
- Prevent moisture due to condensation by increasing surface temperature or reducing the moisture level in air (humidity). To increase surface temperature, insulate or increase air circulation. To reduce the moisture level in air, repair leaks, increase ventilation (if outside air is cold and dry), or dehumidify (if outdoor air is warm and humid).
- Keep heating, ventilation, and air conditioning (HVAC) drip pans clean, flowing properly, and unobstructed.
- Vent moisture-generating appliances, such as dryers, to the outside where possible.
- Maintain low indoor humidity, below 60% relative humidity (RH), ideally 30-50%, if possible.

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- Perform regular building/HVAC inspections and maintenance as scheduled.
- Clean and dry wet or damp spots within 48 hours.
- Don't let foundations stay wet. Provide drainage and slope the ground away from the foundation.

## Hidden Mold

In some cases, indoor mold growth may not be obvious. It is possible that mold may be growing on hidden surfaces, such as the backside of dry wall, wallpaper, or paneling, the top of ceiling tiles, the underside of carpets and pads, etc. Possible locations of hidden mold can include pipe chases and utility tunnels (with leaking or condensing pipes), walls behind furniture (where condensation forms), condensate drain pans inside air handling units, porous thermal or acoustic liners inside ductwork, or roof materials above ceiling tiles (due to roof leaks or insufficient insulation).

Some building materials, such as dry wall with vinyl wallpaper over it or wood paneling, may act as vapor barriers, trapping moisture underneath their surfaces and thereby providing a moist environment where mold can grow. You may suspect hidden mold if a building smells moldy, but you cannot see the source, or if you know there has been water damage and building occupants are reporting health problems. Investigating hidden mold problems may be difficult and will require caution when the investigation involves disturbing potential sites of mold growth—make sure to use PPE.

For example, removal of wallpaper can lead to a massive release of spores from mold growing on the underside of the paper. If you discover hidden mold, you should revise your remediation plan to account for the total area affected by mold growth.

## Remediation Plan

Assess the size of the mold or moisture problem and the type of damaged materials before planning the remediation work.

The decision to relocate occupants should consider the size and type of the area affected by mold growth, the type and extent of health effects reported by the occupants, the potential health risks that could be associated with debris and the amount of disruption

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likely to be caused by remediation activities. If possible, remediation activities should be scheduled during off-hours when building occupants are less likely to be affected.

## Remediation

1. Fix the water or humidity problem. Complete and carry out repair plan if appropriate. Revise and carry out maintenance plan if necessary. Revise remediation plan as necessary, if more damage is discovered during remediation.
2. Continue to communicate with building occupants, as appropriate to the situation. Be sure to address all concerns.
3. Completely clean up mold and dry water-damaged areas. Select appropriate cleaning and drying methods for damaged/ contaminated materials. Carefully contain and remove moldy building materials. Use appropriate Personal Protective Equipment (PPE). Arrange for outside professional support if necessary.

## The Key to Mold Control

If you are unsure what to do, or if the item is expensive or of sentimental value, you may wish to consult a specialist. Specialists in furniture repair/restoration, painting, art restoration and conservation, carpet and rug cleaning, water damage, and fire/water restoration are commonly listed in phone books. Be sure to ask for and check references; look for affiliation with professional organizations. **Molds Can Damage Building Materials and Furnishings**

## Cleanup Methods

A variety of mold cleanup methods are available for remediating damage to building materials and furnishings caused by moisture control problems and mold growth. The specific method or group of methods used will depend on the type of material affected. Please note that professional remediators may use some methods not covered in these guidelines; absence of a method in the guidelines does not necessarily mean that it is not useful.

### *Method 1: Wet Vacuum*

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Wet vacuums are vacuum cleaners designed to collect water. They can be used to remove water from floors, carpets, and hard surfaces where water has accumulated. They should not be used to vacuum porous materials, such as gypsum board. They should be used only when materials are still wet—wet vacuums may spread spores if sufficient liquid is not present. The tanks, hoses, and attachments of these vacuums should be thoroughly cleaned and dried after use since mold and mold spores may stick to the surfaces.

### ***Method 2: Damp Wipe***

Whether dead or alive, mold is allergenic, and some molds may be toxic. Mold can generally be removed from nonporous (hard) surfaces by wiping or scrubbing with water, or water and detergent. It is important to dry these surfaces quickly and thoroughly to discourage further mold growth. Instructions for cleaning surfaces, as listed on product labels, should always be read and followed. Porous materials that are wet and have mold growing on them may have to be discarded. Since molds will infiltrate porous substances and grow on or fill in empty spaces or crevices, the mold can be difficult or impossible to remove completely.

### ***Method 3: HEPA Vacuum***

HEPA (High-Efficiency Particulate Air) vacuums are recommended for final cleanup of remediation areas after materials have been thoroughly dried and contaminated materials removed. HEPA vacuums are also recommended for cleanup of dust that may have settled on surfaces outside the remediation area. Care must be taken to assure that the filter is properly seated in the vacuum so that all the air must pass through the filter. When changing the vacuum filter, remediators should wear PPE to prevent exposure to the mold that has been captured. The filter and contents of the HEPA vacuum must be disposed of in well-sealed plastic bags.

### ***Method 4: Discard***

#### **Remove Damaged Materials and Seal in Plastic Bags**

Building materials and furnishings that are contaminated with mold growth and are not salvageable should be double-bagged using 6-mil polyethylene sheeting. These materials

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can then usually be discarded as ordinary construction waste. It is important to package mold contaminated materials in sealed bags before removal from the containment area to minimize the dispersion of mold spores throughout the building. Large items that have heavy mold growth should be covered with polyethylene sheeting and sealed with duct tape before they are removed from the containment area.

Always use gloves and eye protection when cleaning up mold!

## Personal Protective Equipment (PPE)

If the remediation job disturbs mold and mold spores become airborne, then the risk of respiratory exposure goes up. Actions that are likely to stir up mold include: breakup of moldy porous materials such as wallboard; invasive procedures used to examine or remediate mold growth in a wall cavity; actively stripping or peeling wallpaper to remove it; and using fans to dry items.

The primary function of Personal Protective Equipment (PPE) is to avoid inhaling mold and mold spores and to avoid mold contact with the skin or eyes.

### *Skin and Eye Protection*

Gloves are required to protect the skin from contact with mold allergens (and in some cases mold toxins) and from potentially irritating cleaning solutions. Long gloves that extend to the middle of the forearm are recommended. The glove material should be selected based on the type of materials being handled. If you are using a biocide (such as chlorine bleach) or a strong cleaning solution, you should select gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC. If you are using a mild detergent or plain water, ordinary household rubber gloves may be used. To protect your eyes, use properly fitted goggles or a full-face respirator with HEPA filter. Goggles must be designed to prevent the entry of dust and small particles. Safety glasses or goggles with open vent holes are not acceptable.

### *Respiratory Protection*

Respirators protect cleanup workers from inhaling airborne mold, mold spores, and dust.

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*Minimum:* When cleaning up a small area affected by mold, you should use an N-95 respirator. This device covers the nose and mouth, will filter out 95% of the particulates in the air, and is available in most hardware stores.

*Limited:* Limited PPE includes use of a half-face or full-face air purifying respirator (APR) equipped with a HEPA filter cartridge. These respirators contain both inhalation and exhalation valves that filter the air and ensure that it is free of mold particles. Note that half face APRs do not provide eye protection. In addition, the HEPA filters do not remove vapors or gases. You should always use respirators approved by the National Institute for Occupational Safety and Health (see Resources List).

*Full :* In situations in which high levels of airborne dust or mold spores are likely or when intense or long-term exposures are expected (e.g., the cleanup of large areas of contamination), a full-face, powered air purifying respirator (PAPR) is recommended. Full-face PAPRs use a blower to force air through a HEPA filter. The HEPA-filtered air is supplied to a mask that covers the entire face or a hood that covers the entire head. The positive pressure within the hood prevents unfiltered air from entering through penetrations or gaps. Individuals must be trained to use their respirators before they begin remediation. The use of these respirators must be in compliance with OSHA regulations.

## ***Disposable Protective Clothing***

Disposable clothing is recommended during a medium or large remediation project to prevent the transfer and spread of mold to clothing and to eliminate skin contact with mold.

*Limited:* Disposable paper overalls can be used.

*Full:* Mold-impervious disposable head and foot coverings, and a body suit made of a breathable material, such as TYVEK®, should be used. All gaps, such as those around ankles and wrists, should be sealed (many remediators use duct tape to seal clothing).

## Containment

The purpose of containment during remediation activities is to limit release of mold into the air and surroundings, in order to minimize the exposure of remediators and building

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occupants to mold. Mold and moldy debris should not be allowed to spread to areas in the building beyond the contaminated site.

In general, the size of the area helps determine the level of containment. However, a heavy growth of mold in a relatively small area could release more spores than a lighter growth of mold in a relatively large area. Choice of containment should be based on professional judgment. The primary object of containment should be to prevent occupant and remediators exposure to mold.

### *Limited Containment*

Limited containment is generally recommended for areas involving between 10 and 100 square feet (ft<sup>2</sup>) of mold contamination. The enclosure around the moldy area should consist of a single layer of 6- mil, fire-retardant polyethylene sheeting. The containment should have a slit entry and covering flap on the outside of the containment area.

For small areas, the polyethylene sheeting can be affixed to floors and ceilings with duct tape.

For larger areas, a steel or wooden stud frame can be erected and polyethylene sheeting attached to it.

All supply and air vents, doors, chases, and risers within the containment area must be sealed with polyethylene sheeting to minimize the migration of contaminants to other parts of the building. Heavy mold growth on ceiling tiles may impact HVAC systems if the space above the ceiling is used as a return air plenum. In this case, containment should be installed from the floor to the ceiling deck, and the filters in the air handling units serving the affected area may have to be replaced once remediation is finished.

The containment area must be maintained under negative pressure relative to surrounding areas. This will ensure that contaminated air does not flow into adjacent areas. This can be done with a HEPA-filtered fan unit exhausted outside of the building. For small, easily contained areas, an exhaust fan ducted to the outdoors can also be used. The surfaces of all objects removed from the containment area should be remediated/cleaned prior to removal

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Moisture Control is the Key to Mold Control

## *Full Containment*

Full containment is recommended for the cleanup of mold contaminated surface areas greater than 100 ft<sup>2</sup> or in any situation in which it appears likely that the occupant space would be further contaminated without full containment. Double layers of polyethylene should be used to create a barrier between the moldy area and other parts of the building. A decontamination chamber or airlock should be constructed for entry into and exit from the remediation area. The entryways to the airlock from the outside and from the airlock to the main containment area should consist of a slit entry with covering flaps on the outside surface of each slit entry. The chamber should be large enough to hold a waste container and allow a person to put on and remove PPE. All contaminated PPE, except respirators, should be placed in a sealed bag while in this chamber.

Respirators should be worn until remediators are outside the decontamination chamber. PPE must be worn throughout the final stages of HEPA vacuuming and damp-wiping of the contained area. PPE must also be worn during HEPA vacuum filter changes or cleanup of the HEPA vacuum.

## **Test Procedures Used for Airborne Mold**

Air Sampling was taken with a CyClex Bioaerosol Impactor and an external Thomas air pump. The Thomas air pump was calibrated to 20 liters of air per minute (LPM). The time of the air sample is determined by the traffic area and wind velocity. This is determined by the sampler and is recorded. The sampler also records times, temperature, Relative humidity, and dew points. The calibration is checked and monitored before, during, and after sample collection. The air pump, tubing and CyClex are air flushed for 1 minute @ 30-35LPM before testing. The CyClex Impactor is cleaned and sanitized with alcohol swabs prior to testing, to avoid any cross contamination. A sanitized prepared glass slide is then removed from its seal package and placed into the CyClex Impactor for the desired type test. The Mold spores are collected on a precoated glass slide that is placed in to the CyClex Impactor.

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The collection of the spores operates upon the principle of inertial impaction. Airflow is accelerated as it is drawn through the tapered inlet and directed through a 360 Degree hole towards the glass, coated slide, containing an optically clear collection media. Particles adhere to the collection media while the airflow continues out of the orifice. Microscopic spore counts, non-viable, are determined through light microscopy using the glass slide.

One outdoor sample is also collected to provide the background reference data for quantity and type mold spores present in the ambient air. This is considered the “AIR INDEX”

Samples are analyzed via light microscopy at 600X Magnification, with the entire slide (100% of the sample) being analyzed. The results are reported as a total meaning that they include both viable and non-viable spores. Unfortunately, this technique does not allow for the differentiation between *Aspergillus* and *Penicillium*, and *Trichoderma* and other are grouped together as *Amerospores*. Additionally it does not allow for cultivation or speciation of spores. Slides containing greater than 500 fungal spores are difficult to count accurately due to over crowding and are therefore estimations. Similarly, excessive non-microbial particulates can mask the presence of fungal spores, thereby reducing counting accuracies.

## **Swab Testing Procedures**

Each and any swab tests made are performed by the use of a sterile swab. Rolling the swab over a 1 square inch area performs each collection. Each swab is the placed in its sterile transporter and shipped to the labs.

### In Wall Testing Procedures

\_ All in wall tests are performed by the use of a CyClex Wall Kit. A hole is drilled with a hand (Low speed) drill, to reduce dust. A Wall probe with a dust cover is then inserted into the wall cavity. The debris cap is then removed and the sanitized tubing connected to the CyClex Wall Kit adapter. The adapter and tubing are cleaned and sanitized before all testing is performed. The pump is calibrated and monitored to 20LPM for 2 minutes per wall check

## **Analysis of Samples**

The U.S. Environmental Protection Agency published the "Mold Remediation in Schools and Commercial Buildings" document that also provides guidelines and insight on clean-up procedures.

Common suggestions among the various documents include:

- Correct the source of excessive moisture.

- When handling or cleaning moldy materials, consider using a mask or respirator for protection against inhaling airborne spores. Respirators can be purchased from hardware stores; select one for particle removal (sometimes referred to as a N95 or TC-21C particulate respirator).
- Wear protective gloves, eye protection glasses, and clothing should be immediately washed.
- Take care 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 area.
- 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 (e.g., ceiling tiles and insulation, and wallboard) with more than a small area of contamination should be removed and discarded. Porous materials 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.

Periodic inspections should be conducted to confirm the effectiveness of Remediation work.

Please note that I am not an Industrial hygienist or a Remediation Company.

The reader should be aware that the reference documents contain conflicting and inconclusive information about health effects from exposure to mold clean-up procedures, acceptable indoor air moisture levels and ventilation. However, two issues most experts agree upon are: active mold growth should be removed, and eliminating excessive moisture is required to stop mold growth. Armed with information from the reference documents, the reader should be able to make an informed decision about dealing with mold.

Note that there isn't a numerical criterion for interpreting environmental measurements.

The California Department of Health Services also publishes clean-up procedures that are more oriented toward homeowners. At [www.cal-iaq.org/mold9803.htm](http://www.cal-iaq.org/mold9803.htm). The clean-up procedures established by this California agency recommend the use of a disinfectant (chlorine bleach) whereas the New York City guideline does not make a recommendation for use of a disinfectant.

This report is based on a visual inspection of the listed items and does not include any other systems of the property.

Latent and concealed defects and deficiencies are excluded from this inspection.

The conclusions and recommendations of this report represent my opinion of the existing structure. Protection Home Inspection is not responsible for the conclusion, opinions, or recommendation made by others based on the information in this report.

The inspection involved visual techniques only, utilizing non -destructive evaluation and no material testing, subsurface investigation or design work has been done as part of this report.

Neither this survey nor this report constitutes an exhaustive technical evaluation.

This report is prepared for the sole and exclusive use of the client. This report is based on apparent conditions existing at the time of inspection only. The conditions of the property may change due to factors such as water and moisture leaks, actions taken by owners or others, or the passing of time itself.

The client must accept responsibility for all risks for all items which are not reasonably detectable with in the scope of this inspection.

I have made every effort to perform a comprehensive and thorough inspection with recommendations for this property. I do not offer or imply any warranties or insurance to cover possible errors or hidden defects. If you have any questions regarding this inspection or need further evaluation, please let me know.

Sincerely,

A handwritten signature in cursive script that reads "Forrest A. Sutherland".

Forrest A. Sutherland

*President*

