



Limited Mold Investigation Report

Subject Property Located At:
123 Main Street
Anytown, CA 91111

April 1, 2005

Prepared for: Jack and Jill Hill
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Anytown, CA 90503-1006

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Limited Mold Investigation Report Reliance Statement and Warranty

Gold Health and Safety Consulting, Inc. (“GSC”) was engaged by Jack and Jill Hill (“Client”) to conduct a limited investigation of the condition of the real property located at 123 Main Street, Anytown, California, with respect to mold contamination conditions as based on available information and data at the time of GSC’s investigation. GSC performed the investigation at the subject property on March 20, 2005 in accordance with generally accepted professional practices.

GSC’s services consist of professional opinions and recommendations made in accordance with generally accepted engineering principles and practices and are designed to provide a tool to assist the Client. GSC or those representing GSC bear no responsibility for the actual condition of the structure or safety of an investigated site regardless of the actions taken by the Client.

Upon acceptance of the report, the Client agrees that GSC’s investigation shall be limited by the terms and conditions stated in GSC’s report, and that the actual site conditions at the subject property may change with time; that hidden conditions (not discoverable within the scope of this assessment) may exist at the site; and that the scope of this investigation was limited by time, budget and other constraints imposed by the Client.

Regardless of the findings of GSC’s limited investigation, GSC makes no warranty that the site is free from existing or threatened mold, bacteria, or other contaminants, and GSC is not responsible for consequences or conditions arising from facts that were concealed, withheld, or not fully disclosed at the time the inspection was conducted. Suspect asbestos-containing building materials and suspect lead-based paints were not characterized during the investigation. Removal and disposal of asbestos or lead containing materials must follow all applicable Federal, State, and local regulatory requirements.

GSC represents to the Client that it has used the degree of care and skill ordinarily exercised by environmental consultants in the preparation of the limited investigation for the subject property and in the assembling of data and information related thereto, in accordance with generally accepted professional practices. No other warranties are made either expressed or implied.

GSC is not licensed as medical professionals; therefore the conclusions and recommendations contained within this report do not constitute medical opinions, human health risk analysis, or public health alerts. A licensed physician should be consulted for such opinions.

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A. LABORATORY ANALYTICAL RESULTS

Section 1.0 - GENERAL BACKGROUND

1.1 Introduction and Purpose

Gold Health and Safety Consulting, Inc. (“GSC”) was engaged by Jack and Jill Hill (“Client”) to conduct a limited mold contamination investigation of the real property located at 123 Main Street, Anytown, California. The sole purpose of this limited investigation was to provide the Client with information regarding the condition of the subject property with respect to mold contamination at the time of the investigation.

1.2 Site Background and History

The subject property is a single townhouse unit within a multi-family building located in Anytown, California. The townhouse consists of three stories. The basic construction of the townhouse is a concrete slab-on-grade foundation, wood frame walls, and a roof combined of wood shingles and flat areas of rolled tar paper finished with hot mop. Exterior walls are finished with wood siding and stucco. Interior walls and ceilings are finished with gypsum drywall.

During the course of GSC’s on-site activities, GSC representative Dave Gold, CIH met with Jean and Robert Hill, the owners and occupants of the subject property. Mr. and Mrs. Hill stated that they have lived within the subject property for several years. Mr. and Mrs. Hill reported that the windows on the north exterior side of the townhouse building leaked moisture during recent inclement weather (January 2005). The Homeowner’s Association reportedly has hired a contractor to repair the problem; during the investigation plastic sheeting was observed covering the windows on the exterior of the building. The Hills also report that there had been a rain water leak around the third floor South Bedroom window that occurred on November 28, 2004. Immediately following this incident, structure drying services were obtained (industrial dehumidifiers and fans) to eliminate the moisture.

In addition, Mrs. Hill reports that she has observed mold growth on her clothing and shoes that are stored within the master bedroom walk-in closet. There was no history reported of moisture intrusion into the walls of the closet.

Finally, the Hills stated that a drain pipe within the garage near the west wall had leaked several months ago, wetting portions of the garage wall and ceiling. No structure drying services were obtained following this incident.

Mr. Hill states that he suffers from chronic pulmonary obstructive disorder and is therefore highly concerned about possible respiratory distress from airborne mold spores.

Section 2.0 – INVESTIGATION METHODOLOGY

2.1 General Methodology

GSC performed the investigation at the subject property on March 20, 2005 in accordance with generally accepted professional practices. Our investigations typically include the following components:

- Visually inspecting selected areas of interest within the subject property for signs of mold growth and moisture intrusion;
- Collecting samples for mold as requested by the Client and submitting them to a qualified laboratory for analysis; and,
- Providing the Client with a written report of the limited indoor air quality investigation findings and conclusions.

2.2 Analytical Laboratory Services

All samples collected by GSC during the course of the investigation were forwarded under appropriate chain of custody to Environmental Microbiology Laboratories, Inc. (“EML”) of San Diego, California’s Long Beach satellite recreation room for analysis. EML is accredited by the American Industrial Hygiene Association for Environmental Microbiology analysis. Standard turnaround time for the analytical results was requested by the client.

2.3 Airborne Total Mold Spore Sampling

Non-viable spore trap air samples were collected through the use of a Buck BioAire air sampling pump set at a flow rate of approximately 15 liters per minute for five (5) minutes. The sample pump is field calibrated through the use of a floating ball rotameter at the start of the sample collection process. The rotameter receives an annual calibration by the Buck Company through the use of a primary calibration device. Zefon Air-O-Cell brand non-viable spore trap air sampling cassettes were utilized as the sample collection media.

After receipt by the laboratory, the samples are analyzed via direct microscopy for total spore count. This laboratory procedure is useful in providing rapid quantitative analyses of airborne mold spores, which are an indicator of the presence of mold growth reservoirs within building materials and their impact on indoor air quality.

2.4 Wall Cavity Airborne Spore Sampling

A helpful technique towards diagnosing the potential presence of fungal growth reservoirs within wall cavities without cutting access panels is to collect “Wall-Chek” samples. In order to collect these samples, a Zefon Air-O-Cell Cell brand non-viable spore trap air sampling cassette is hooked to adapter tubing. Then, the end of the Wall-Chek adapter is placed into a 3/8 inch hole drilled into the wall to be sampled. In some cases, existing access holes into wall cavities may be used. The sample is then collected utilizing the Buck BioAire sampling pump at a rate of 75 liters per minute for two minutes. Following field activities, the samples are submitted to the laboratory and analyzed via direct microscopy for total spore count.

2.5 Surface Sampling

Surface samples are collected by lightly pressing cellophane tape against the surface to be sampled. The tape is then mounted on a glass microscope slide. Following field activities, the samples are submitted to the laboratory for direct microscopic screen and fungal identification. This sample analysis is performed to qualitatively identify mold species that may be present upon a surface, indicating actual fungal growth or settled spore contamination.

Section 3.0 – OBSERVATIONS

GSC representative Dave Gold, CIH conducted a limited on-site investigation at the subject property on March 20, 2005. As moisture is necessary for mold growth to occur, surveying for excess moisture in building materials, or observing areas of apparent moisture damage, can be helpful in locating mold growth reservoirs. In addition, it is sometimes possible to observe surface mold growth.

3.1 Site Walk

The clients provided GSC with access to the subject property (townhouse). Once inside, GSC conducted a visual survey of all accessible areas of the residence.

Due to the presence of stored items, not all wall surface areas within the First Floor (recreation room) and master bedroom closet were visible at the time of the investigation.

3.2 Visual Inspection

GSC's visual observations were as follows:

- Garage.
 - Moisture damage (stains and decay) was observed on the ceiling near the west wall, surrounding an apparent drain pipe penetration. Moisture damage (stains) were also observed on the south and west walls, near the southwest corner.
 - A patch of green-colored mold growth was observed on the west wall of the garage at a height of approximately 5 feet, at a distance of approximately 3 feet from the south corner. The size of the mold growth was approximately 2 square feet. The presence of mold growth was confirmed via source sampling and laboratory analysis.
 - Two small access hatches (each approximately 3 inches by 3 inches) were cut open in moisture stained areas so that the underlying wall cavity could be inspected for the presence of mold growth. One of these hatches was located in the south wall near the west corner; the other in the west wall near the south corner. Upon opening the wall cavities, no mold growth was observed in either of these areas.
- First Floor (Recreation room).
 - Moisture damage (drywall decay) was observed around the window sill of the north window. The effected area was approximately 2 square feet in size. Moisture damage often indicates the presence of mold growth beneath the damaged surfaces.
 - The east wall (opposite the reported leaking pipe in the garage) was inspected for surface damage; none was found. In addition, a small access hatch was cut open in the east wall near its base, close to the south corner, so that the underlying wall cavity could be inspected for the presence of mold growth. Upon opening the wall cavity, no mold growth was observed in this area.
- First Floor to Second Floor Stairwell.
 - Moisture damage (drywall decay) was observed surrounding the window sill of the north window. The effected area was approximately 3 square feet in size. Moisture damage often indicates the presence of mold growth beneath the damaged surfaces.

- GSC removed a piece of drywall from the right side frame of the window. No mold growth was observed in this area; however, the underlying wood member appeared to have extensive termite damage.
- GSC cut open a small access hatch in the north wall just below the lower right corner of the window, so that the underlying wall cavity could be inspected for the presence of mold growth. Upon opening the wall cavity, no mold growth was observed in this area.
- Third Floor Hallway.
 - Moisture damage (drywall decay) was observed surrounding the window sill of the north window. The effected area was approximately 2 square feet in size. Moisture damage often indicates the presence of mold growth beneath the damaged surfaces.
 - GSC removed a piece of drywall from the lower sill of the window. Mold growth was observed on the reverse of the drywall in this area. The presence of mold growth was confirmed via source sampling and laboratory analysis.
- Master Bedroom Closet.
 - There were no signs of moisture intrusion within the accessible areas of the closet. GSC observed a few leather shoes that had minor amounts of mold growth on them.
- South Bedroom.
 - Moisture damage (stains) was observed surrounding the east window in this area.

3.3 Temperature and Humidity Readings

The American Society of Heating, Refrigeration, and Air Conditioning Engineers (“ASHRAE”) in their Standard 62-1989 recommends a maximum indoor humidity level of 60 percent for living and working spaces. Elevated levels of indoor humidity can contribute to mold growth and the reproduction of dust mites.

GSC collected temperature and humidity readings from selected areas within the subject property utilizing an Extech hand-held humidity and temperature monitor. At the time of GSC’s investigation, interior humidity readings (55 to 59 percent) were within the recommended range. It should be noted that at the time of the inspection, the outdoor humidity level was at 64 percent.

3.4 Moisture in Building Materials Readings

In order to determine the current moisture content of building materials, and to identify additional areas potentially impacted by mold growth and potential sources of moisture intrusion, GSC conducted testing at the subject property to determine moisture content of suspect building materials. Readings of over 65% relative moisture content in gypsum drywall and over 20% for wood members are considered at high risk for mold infestation.

Moisture readings were gathered at the subject property using a Delmhorst BD2100 hand-held moisture meter. At the time of GSC's investigation, the following moisture meter readings were above normal tolerances:

Table I: Abnormal Moisture Meter Readings

Location	Material Type	% Relative Moisture Content	Interpretation
First floor to second floor stairwell, around window	Drywall	99.9%	At Risk
Third floor hallway, around window frame	Drywall	45%	Elevated

The results of GSC's moisture meter survey, in areas where moisture damage was evident or suspected, revealed the presence of recent moisture intrusion around the first floor to second floor stairwell window, and to a lesser extent, around the third floor window. These moisture intrusion problems should be corrected as soon as possible so that further moisture intrusion does not occur.

It should be noted that repairs at the time of the investigation plastic sheeting was covering the exterior of the building in both of the aforementioned areas.

Section 4.0 – LABORATORY ANALYSIS FINDINGS

4.1 Airborne Mold Spore Sampling Results

Four air samples for total airborne mold spore count were collected at the subject property and subsequently submitted to the laboratory for analyses. Three of these samples were collected indoors, including from specific areas of interest. The remaining sample was collected from outside the structure for use as a background reading for comparative analysis.

The results of the laboratory analysis are summarized in following table:

Table II: Summary of Total Airborne Mold Spores Analysis Results

Location	Result, Spores/M³	Interpretation
First Floor (Recreation room)	826	Total Normal; Elevated Species Presence
Between Family Room/Kitchen	985	Normal Tolerances
Master Bedroom	907	Normal Tolerances
Outdoors	2670	Baseline

The results of the analysis indicate that on the date and time of GSC’s sampling, indoor airborne mold spore total counts were within normal tolerances, with the exception of the First Floor (recreation room) sample. This sample showed a raw count of four (4) spores of the *Stachybotrys* species. While the presence of low counts of *Stachybotrys* is not unhealthful, it does indicate the strong possibility of the presence of mold growth reservoirs in the nearby vicinity. For further discussion about these results, please see Section 5.0.

For detailed information of the laboratory results, a copy of EML’s report is attached in Appendix A of this report.

4.2 Summary of Wall Cavity Air Sampling Results

One sample was collected for total airborne spore count from a wall cavity that was reported to be subjected to moisture intrusion. The results were as follows:

Table III: Summary of Wall Cavity Airborne Fungal Spores Analysis Results

Location	Result, Spores/M³	Results Interpretation
3 rd Floor South Bedroom	267	Normal

The laboratory results did not indicate the presence of fungal growth reservoirs in the wall cavity tested. However, it should be noted that the tested wall cavity contained fiberglass insulation, which can reduce the effectiveness of wall cavity sampling. These results are discussed further in Section 5.0.

For detailed information, a copy of EML's report is attached in Appendix A of this report.

4.3 Surface Sample Results

Two surface samples were collected from the subject property during the course of the investigation from areas of suspect mold growth, and submitted to the laboratory for analysis. The results of the laboratory analysis of the samples are summarized in following table:

Table IV: Summary of Surface Sampling Analysis Results

Location	Source Type	Predominant Species	Impression
3 rd floor hallway window, lower sill	Drywall reverse	<i>Stachybotrys,</i> <i>Penicillium/Aspergillus</i>	Mold growth
Garage, west wall, suspect green colored reservoir	Drywall surface	<i>Penicillium</i>	Mold growth

The results of the sampling showed mold growth in the areas tested. For further information, please refer to EML's Direct Microscopic Examination Report, which is included in Appendix A of this report.

Section 5.0 – DISCUSSION and CONCLUSIONS

GSC's conclusions are based upon the conditions observed at the date and time of the investigation, as well as the available information and data. Topics not explicitly discussed within this document should not be assumed to have been investigated.

There are currently no widely accepted guidelines or government regulations that determine “safe” or “normal” airborne mold spore levels. An “elevated” concentration of spores does not necessarily constitute an unhealthful environment. Furthermore, human response to elevated concentrations of mold spores can vary greatly. However, indoor counts are generally expected to be two-thirds to half the amount detected outdoors, and should typically reflect the same general distribution of spore varieties present outdoors. Indoor and outdoor airborne mold spore level comparisons should be evaluated with an awareness of the building type, activity level, and weather conditions present at the time of sampling. Variation is an inherent part of biological air sampling. The presence or absence of a few genera in small numbers should not be considered abnormal.

At the subject property, GSC observed mold growth reservoirs on the surface of the west wall within the garage. We also observed moisture damage surrounding all three north wall windows, and at the third floor window frame lower sill, mold growth on the reverse of the drywall. We also observed a small amount of mold growth appearing on shoes stored within the master bedroom closet.

Results for total airborne mold spores indicated the possible presence of a reservoir of *Stachybotrys* species mold within or nearby the first floor recreation room. However, there were no observations of such mold growth nearby this area. The only *Stachybotrys* observed at the subject property was surrounding the third floor window frame. It is possible that additional mold growth reservoirs exist within or near the first floor recreation room. All other areas tested indicated normal airborne spore levels within the townhouse.

A single wall cavity total airborne spore sample from the wall beneath the east window of the South Bedroom (third floor) did not reveal the presence of mold reservoirs in this area. As stated previously, this area was wetted by a leak that occurred during November 2004, but it did receive professional structure drying services at that time. It should also be noted that the presence of fiberglass insulation present within this wall reduces the effectiveness of the sampling technique.

The presence of mold growth reservoirs and elevated airborne mold spores within human habitations is abnormal and may adversely impact the health of some occupants. Therefore, prompt remediation of areas where mold growth is observed or detected is highly recommended. GSC’s recommendations for mold remediation can be found in Section 6.0 of this report.

Mold growth only occurs when excess moisture is present. Based on our observations, GSC concludes the following moisture intrusion issues occurred or are present at the residence:

1. The windows of the north wall (first floor, first to second floor stairwell, third floor hallway) are leaking.
2. The east window of the South Bedroom (third floor) was reported to have leaked, but apparently has since been repaired.
3. The mold growth on the west wall of the garage appears to be caused by the reported leaking drain pipe in this area. It was reported that this leak has been repaired.
4. The mold growth on the items stored within the master bedroom closet appears to be caused by ambient humidity (the property is located within a coastal environment) combined with a lack of adequate air flow within the closet. There was an over abundance of items being stored within the closet; relocating some of these items so that there is better air circulation within the closet is likely to reduce this problem. In addition, operating an automatic dehumidifier within the closet would be helpful.

Section 6.0 – RECOMMENDATIONS

6.1 Specific Recommendations

GSC recommends the following course of action at the subject property:

Important Note: Remediation should be performed to the standards found in IICRC S520, Standard and Reference Guild for Mold Remediation. Only workers who are thoroughly trained and qualified in mold contamination remediation, equipped with appropriate safety and remediation equipment, should perform the mold contamination remediation. Appropriate methodologies must be used to prevent the further spreading of airborne mold spores when removing contaminated materials, such as infested gypsum wallboard. This typically includes the usage of HEPA-ventilated negative air pressure containment zones, careful demolition, and immediately bagging contaminated materials.

1. Take measures to reduce moisture levels in the master bedroom closet, as discussed in Section 5.0.
2. The three leaking windows along the north wall need to be repaired.
3. Consult with a licensed pest control operator who specializes in structural pests regarding the suspect termite damage observed at the first floor to second floor window frame.

- Remove the moisture damaged wall/ceiling surfaces from the following areas:

Table V: Minimum Areas for Wall/Ceiling Surface Removal

Room	Area	Height	Distance
First floor	North window frame	Surrounding window frame where moisture damaged	N/A
First floor to second floor stairwell	North window frame	Surrounding window frame where moisture damaged	N/A
North hallway	North window frame	Surrounding window frame where moisture damaged	N/A
Garage	West Wall	From Floor to Ceiling	From south corner to a distance of 6 feet

- As wall/ceiling surfaces are removed, the underlying cavities and building materials should be inspected for additional hidden mold growth. Wall/ceiling surfaces should be removed to a distance of at least two feet in either direction from the last appearance of mold growth. Any infested insulation or other non-structural building materials must also be removed and disposed. Contaminated materials should be immediately placed in plastic bags and sealed for disposal. There are no special disposal requirements for mold-contaminated materials; these materials can be disposed of as normal refuse or construction debris.
- Clean any mold growth found on structural surfaces within the exposed wall cavities. This typically involves the use of HEPA vacuums, wet scrubbing, sanding, and wiping/drying with disposable wipes.
- Remove and dispose or clean any moldy items discovered in the master bedroom closet.
- Each remediation enclosure and the first floor recreation room should be thoroughly ventilated with HEPA filter equipped ventilation units for a minimum of 24 hours after the above steps are completed. In addition, dehumidifiers should be operated so that all walls are below 35% relative moisture content, and wood moisture content is below 15%.
- Optionally, heat may be applied to the remaining structure using the ThermoPure process to reduce the amount of remaining live mold growth in inaccessible cracks and crevices.

10. After the above steps are complete, the remediation project should be re-inspected and the remediation approved by a qualified mold contamination investigator. The re-inspection should include testing for mold spore contamination and building material moisture levels. The HEPA filtration and dehumidification equipment should be shut off for at least eight hours prior to re-inspection.

Once the above steps are successfully completed, reconstruction of the remediated areas may begin.

GSC recommends re-checking the air within the first floor recreation room approximately six weeks after the final remediation to determine if the levels of *Stachybotrys* observed return. If so, it would indicate that the levels seen are unrelated to the problems discussed herein. Further investigation of the walls surrounding the first floor recreation room would then be recommended. This will require access to the walls throughout the perimeter of the first floor recreation room, including the closet, which during the dates of the inspections were not accessible due to storage.

The steps outlined here are the minimum steps required for remediation. The remediation firm may take additional or different steps as dictated by their judgment and/or operating procedures to adequately abate the mold contamination. In mold remediation situations, it is always possible that additional hidden mold growth may exist in the walls beyond the areas investigated. However, should significant variance from the above Scope of Work be required or other issues regarding remediation arise, the remediation contractor should first obtain concurrence from a qualified industrial hygienist.

6.2 General Recommendations

1. The source(s) of moisture affecting the areas of interest should be verified and corrected, if applicable, by a General Contractor at the earliest opportunity and prior to completion of any remediation action. Failure to correct moisture intrusion issues will result in the re-appearance of mold growth.
2. In the event that any observed growth, discoloration, or deterioration of any building materials or any contents are uncovered during future renovations at the subject property, GSC recommends that the Client consult with a structural engineer and industrial hygienist prior to removing/cleansing any such growth, discoloration, or deteriorated building materials or contents.

APPENDIX A

LABORATORY ANALYTICAL RESULTS