

## Mold Investigation and Cleanup “Sources Must Be Discovered For Effective Cleanup”

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A decade ago, mold was almost never mentioned by residential homeowners. Today, with misinformation, media hype and multi-million dollar lawsuits, mold is becoming one of the most discussed topics in residential real estate. There are classes today where home inspectors can become “mold experts” in as little as 24 hours and more certifications than consumers can keep up with. This article discusses what is being missed in all of the hype and confusion.

I receive frequent calls from consumers that have either discovered mold in their home or have had it discovered during an inspection of a home they are considering purchasing. The main question they ask is how to get rid of the mold. Many turn to the phone book and find that for several hundred to several thousand dollars they can have the mold sprayed, sealed, killed and scrubbed, they can also have the home treated with ozone, have UV lights installed, etc. So what does it all mean? Consumers are confused and this is resulting in poor choices.

One common thing I have noticed in all of the calls I receive is that few, if any, consumers ask the most important question, and that question is what caused mold to grow in the first place. I have also noticed, after questioning the callers that many so-called mold remediation companies do not ask or answer that very important question either. This is creating a real problem for consumers.



**Figure 1 – (Before) Poor mold remediation project.**

**Figure 1** shows a home which I assessed recently. The homeowner had mold on the sheathing in the attic and contacted a company which allegedly killed and sealed the mold. A few months later, the sealer was peeling off and mold was found growing directly on the sealant. The company that performed this remediation did not address any of the building issues which created conditions favorable to fungal amplification and therefore simply charged thousands of dollars to put a short-term band-aid on the problem.

Investigation of the home discovered numerous concerns which should have been addressed as part of any remediation. The conditions included poor ventilation, excessive

humidity in the home, no local exhausts in baths or kitchen, dew-points in the basement, leaking basement walls and poor maintenance of the HVAC system. With all of the conditions favorable to mold growth left unattended, the remediation was doomed from the beginning. After performing the assessment, I developed a plan to correct the building issues which included replacing damaged roof sheathing, installing fascia vents, repairing grades to direct water away from the foundation and installing local exhaust fans in baths and kitchen. In addition, the homeowners were shown how to properly maintain the HVAC system and how to set the humidifier after considering all building moisture sources.

I was surprised to hear that the HVAC technician that serviced the system prior to the remediation suggested that the humidifier be set at 45% in winter months. With the humidifier set at 45%, leaking basement walls, no local exhausts and poor ventilation the relative humidity levels in the home were between 65 and 78%. There was no mention of any of these factors by the remediation company.

This may be for job security, knowing the problem will re-occur again in the future or it may simply be a lack of understanding microbial contamination in buildings and how to effectively deal with it. In any event, the consumer loses. It has been two years since my remediation plan for the building was implemented and I am happy to say, there have been no further problems.

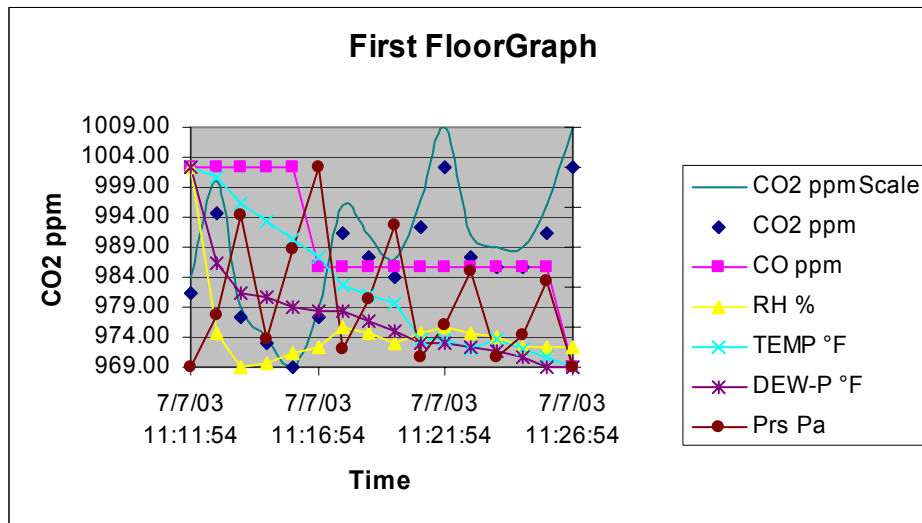


**Figure 2 – (After) Two Yr. after correcting building issues**

The case described is not the exception. Consumers should be better educated on mold and how it gets into their homes and thrives. Without addressing the issues that caused the mold to proliferate in the first place there can be no successful remediation.

As an aid to finding locations of hidden mold growth a clear understanding of locations of moisture damage as well as reasons for the damage is necessary. Cleaning of the building will ultimately be ineffective if moisture problems persist. A moisture meter can be used to determine if some finishes and construction materials which appear superficially dry actually contain significant amounts of moisture.<sup>1</sup>

In addition to a moisture meter, some other equipment which is necessary to properly evaluate a building with mold growth include a digital hygrometer, manometer, laser thermometer and a meter for measuring building parameters such as CO, CO<sub>2</sub>, temperature, humidity, dry/wet bulb temperature and air velocity. Such a piece of equipment is the Solomat IAQ Surveyor produced by Lumidor. The equipment is expensive, but it is hand-held and includes data logging and graphing capabilities. **Figure 3** shows graph of building parameters made from IAQ Surveyor.



**Figure 3**

<sup>1</sup> **CLEANING PROCEDURES FOR MOLD**, Philip R. Morey, Air Quality Sciences, Inc., Atlanta, GA and Gettysburg, PA, USA, *Proceedings of Healthy Buildings 2000*, Vol. 3 pg. 39-48

| Date & Time     | CO2 ppm | CO ppm | RH %  | TEMP °F | DEW-P °F | Prs Pa |
|-----------------|---------|--------|-------|---------|----------|--------|
| 7/7/03 11:47:50 | 1564.00 | 1.80   | 50.80 | 70.60   | 51.80    | 0.700  |
| 7/7/03 11:48:50 | 1092.00 | 1.80   | 51.10 | 70.70   | 51.80    | 0.200  |
| 7/7/03 11:49:50 | 970.00  | 1.80   | 51.20 | 70.80   | 51.90    | 0.000  |
| 7/7/03 11:50:50 | 979.00  | 1.80   | 50.20 | 71.50   | 52.00    | -0.100 |
| 7/7/03 11:51:50 | 996.00  | 1.80   | 49.20 | 72.10   | 52.00    | 0.000  |
| 7/7/03 11:52:50 | 987.00  | 1.80   | 48.30 | 72.60   | 52.00    | 0.000  |
| 7/7/03 11:53:50 | 1000.00 | 1.80   | 48.10 | 72.80   | 52.10    | -0.100 |
| 7/7/03 11:54:50 | 1022.00 | 1.90   | 47.90 | 73.20   | 52.20    | -0.100 |
| 7/7/03 11:55:50 | 1029.00 | 1.90   | 47.40 | 73.40   | 52.20    | -0.100 |
| 7/7/03 11:56:50 | 1042.00 | 1.90   | 47.10 | 73.60   | 52.20    | -0.100 |
| 7/7/03 11:57:50 | 1002.00 | 1.90   | 46.70 | 73.70   | 52.10    | 0.000  |
| 7/7/03 11:58:50 | 1054.00 | 1.90   | 46.60 | 73.80   | 52.10    | 0.000  |
| min             | 970.00  | 1.80   | 46.60 | 70.60   | 51.80    | -0.100 |
| max             | 1564.00 | 1.90   | 51.20 | 73.80   | 52.20    | 0.700  |
| ave             | 1061.42 | 1.84   | 48.72 | 72.40   | 52.03    | 0.033  |

**Figure 4**

**Figure 4** shows readings taken using the IAQ surveyor. The measurements can be taken over time (minutes, hours) to show changing conditions within the building. The parameters can be used as indicators for planning further investigation into such factors as ventilation, moisture and humidity, and building pressures.

Consumers have been given advice from various sources telling them that if they see mold, have it remediated. This is true to some degree. However, the building should be evaluated by a qualified professional to determine the sources of the problem. This is especially true if there are health complaints or if there is a possibility of litigation. If a building occupant has allergies, asthma or other respiratory ailments, an improper remediation could have a devastating affect. Understanding the building is a critical component to any remediation strategy if it is to be effective. Consumers should understand that cleaning up the mold without addressing the conditions which allowed the growth will do little in the long run and growth will likely reappear in the future. It should also be understood that the conditions (moisture) which allowed the fungal amplification to begin could also be damaging other critical building components. Depending on the ease of access or lack thereof, there may be a chronic water penetration problem into the structure which has damaged critical structural components of the building, such as often occurs in homes with shallow crawlspaces. These conditions should be evaluated by a professional to determine the exact nature of the problem and the subsequent damage. Mold may not be the only concern if the structure collapses or a rotted floor gives way and someone breaks a leg.

Another issue which requires careful consideration is having the home tested for mold. With home inspection organizations promoting overnight mold experts, consumers may be shelling out money for meaningless services. Before any testing is ever performed in a building, it should be determined exactly what information is to be gained from testing. A visual assessment by a qualified indoor air quality professional can verify mold in many cases without expensive testing. If litigation is involved or occupants believe symptoms may be related to bioaerosol exposure the services of a qualified professional that understands the limitations of sampling will be required. Sampling of suspected materials and air are a complicated issue which requires a thorough understanding of sampling techniques and methodologies as well as quality control and quality assurance issues. There are many variables to consider when selecting equipment, media

and analysis used for the samples. Each particular method and media may elicit different results and require different interpretation. This is best left to those that understand the issues involved.

Companies performing remediation work should be properly trained and their employees should also have training and certification so that remediation can proceed safely and cost effectively. The US-based Institute of Inspection, Cleaning and Restoration Certification is a volunteer organization serving the restoration industry. Membership and certification through organizations such as IICRC, that are industry accepted shows that companies have trained management and employees in proper remediation methods following accepted standards. The latest edition of the IICRC Standard S500, Standard and Reference Guide for Professional Water Damage Restoration contains new standards for dealing with flood and other water damage. Some of the additions in the new edition include:

- The contractor and adjuster should consider whether the occupants should be evacuated for the duration of the work. Factors to consider are the type of mould present, extent, presence of children under 2 years of age, and presence of immuno-compromised individuals. Residents will be advised to seek medical advice.
- The contractor will have to determine if the microbiological contamination has affected the duct systems and air handling units. Air handling units must be shut down and sealed over during the abatement work.
- Containment with heavy polyethylene sheeting and negative pressure systems is strongly advised.
- All mouldy materials must be removed in sealed bags.
- On projects where microbial contamination was remediated, it may be necessary for a third-party to evaluate the effectiveness of the project. The standard recommends that this be considered where there is microbial contamination that can adversely affect occupant health, or high risk occupants in the structure, or where there are public health issues such as care of children or the sick or elderly, or the project is in a public building. The role of the third-party might include assistance with establishing the scope, overseeing the repair work, and performance of testing at completion.<sup>2</sup>

When working with a third party, it is advisable to hire an independent IAQ professional that has no ties to the remediation contractor. This assures that no conflicts of interest exist. It is also helpful to the remediation contractor to have a third party develop a scope of work for the project. This reduces the risk of the contractor being accused of doing too much or too little. Many complaints that I have been hired to investigate involved the extent of the remediation and the expected results. If professional remediation is involved, a third party is also in a better position to explain the remediation process and to determine if the remediation was successful. Many consumers may have unrealistic expectations from a remediation for many reasons. A qualified consultant can provide the facts while dispelling the doubts created by myths and misinformation.

The problem that I see in the advice to remediate mold and not test it is that while this may be good advice, it places many consumers in a vulnerable position. Many fly-by-night remediation companies exploit that advice and convince unsuspecting consumers to perform useless remediation projects without correcting the source of the problem and in many cases remediating the problem ineffectively. This could be prevented if consumers hired qualified IAQ professionals to identify the problems and develop a scope of work for the remediation. The scope of work developed by a IAQ professional can also be used as a yardstick by which we can measure the success of the remediation project. It would be hard to prove if any remediation were successful without some knowledge of a baseline at the beginning of the project.

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<sup>2</sup> IICRC S500 Reference Guide for Professional Water Damage Restoration, Second Edition 1999, Institute of Inspection, Cleaning and Restoration Certification

So what does this all mean? Simply, use common sense in dealing with mold in homes. If there is mold on your shower curtain, clean it. If, on the other hand the walls in your home are covered with mold, contact a professional IAQ consultant that can properly assess the problem and its causes and aid in developing a remediation plan that will be effective.

Finally, in closing, a word of caution. If you suspect that you have a mold problem, be suspect of remediation contractors using gimmicks such as chemical fogging, sealing, and long term guarantees. If the source of the problem is not mentioned, you may be paying a lot of money for an unworkable solution.

**About The Author:** Al Tibbs, owner of C.L.I. Construction and Environmental Consultants in Cleveland, OH has over 27 years of experience in building construction, inspection and indoor air quality issues. Al is a certified indoor air quality technician, manager and investigator (CIAQT, CIAQM, CIAQI), a certified combination inspector (ICC) and certified in HVAC system balancing and diagnostics. Visit the C.L.I. web site at [www.closerlookinspection.com](http://www.closerlookinspection.com)