NEW WRINKLES IN THE ONGOING DEBATE ABOUT POST-REMEDIATION PROCEDURES FOR MOLD PROJECTS

In some respects, you would think that an industry that is 15 to 20 years old would have sorted out the most critical basics of the trade in that time. For example, within five or six years of the advent of asbestos abatement as an industry there were guidance documents on how to do the work, and post-abatement clearance values had been introduced. In a similar vein, it only took a few years for individuals faced with the clean-up of illicit drug labs to realize that a value was necessary for determining whether a cleaning endeavor was successful or not. Even EPA's lead renovation, repair, and painting regulations (RRP) provide a color comparator for the evaluation of wipe samples taken at the end of a project, providing some objectivity to a visual inspection.

In contrast, the mold remediation industry is still struggling to define the basics of the most important aspect of the work—how to decide when it has been completed properly. Not only is there no consensus on a numerical value for residual mold that indicates when a clean-up has been completed "well enough", there is still a raging debate regarding what type of sampling, if any, should be utilized to determine project completion.

Professional Debates Create Consumer Confusion

Any time an industry develops to address a hazardous substance there is going to be some thrashing about as the professionals and the public come to grips with the risks of exposure and the best methods to control contact with the material. These discussions and debates involve some weighty subjects, including possible medical effects, exposure monitoring, and the practicality of specific control methodologies.

In the case of mold contamination there is no doubt that the relationship between mold exposure and health effects is complicated, but this is the case with every material that is eventually determined to be a hazardous contaminant. That is why the safety and health industry has both voluntary threshold limit values (TLVs) and mandatory permissible exposure limits (PELs) for the same substance. Therefore, it is an anomaly that after so many years of mold remediation work and billions of dollars spent addressing the problems of mold growth in buildings there is not even a general consensus on a sampling protocol or numerical value that would give clarity to all the parties involved.

Make no mistake; this deficiency of industry consensus has a variety of negative impacts. Without a consensus among professionals or a government imposed numeric benchmark

everyone is left to their own devices to determine not only the risk that any potential exposure poses to occupants prior to remediation, but also an acceptable level of residual contaminant after the project is completed. This has led to movement toward the extreme ends of the spectrum. On one hand, individuals interested in re-occupying a mold-remediated space push for a zero risk of exposure—a demand that is often impractical and frequently borders on the impossible since mold is a natural part of our environment, including the built environment. Then there are those that choose the other absolute extreme, with an attitude that there is no real danger from mold because there is no defined level for "safe" or "clean".

Industry Documents Are Timid

Granted, the situation is not completely bleak. There is some consensus in the industry on post-remediation procedures. EPA, OSHA, the New York City Health Department, Health Canada, the IICRC, and a host of other associations all concur that a thorough visual inspection must be conducted at a mold remediation work site. Most of them also recommend that the analysis results of any sampling be interpreted by a professional. This stance has been misinterpreted by some in the industry to the point that they now advocate that a visual inspection is the only necessary post-remediation activity. This does not make logical sense to the layperson as they try to square the idea of a visual inspection with the circle of understanding that mold spores, fragments, and mycotoxins are too small to be seen without magnification. Furthermore, if a visual inspection was all that was needed to identify whether remediation projects were completed effectively, why is sampling so important that it is mandated for other microscopic contaminants such as asbestos and meth lab residue?

None of the documents that are frequently referenced in regards to mold remediation procedures dares to recommend a specific type of sampling. Should the success of a mold remediation project be evaluated based on air samples for mold spores, surface samples for spores and fragments, residual odors, leftover enzymes from biological matter that includes mold (ATP), or moisture levels? What about some combination of two or more of these?

New Wrinkles in Long-term Questions

You might think that once there was a consensus on the sort of samples to collect, things would get easier. Unfortunately, that is not the case. Even after a decision is made about whether a visual inspection is enough and, if not, what type of samples should be collected, there are still more areas of controversy. Specifically, what sort of analysis should be conducted of the samples, and once the data is received, what comparison criteria should be used to determine whether the project is completed or needs additional work?

A good example of this came in the form of an e-mail from a client. This individual had become sensitized to mold and was suffering some very significant symptoms that had been medically

tracked back to exposure in her home. She had done the hard work of finding a good inspector and a good remediation contractor, but as they were approaching the completion of the clean-up project in her home she contact us for further guidance. After spending a considerable sum to deal with the problem in her home her doctor stated that "air sample tests are not helpful for you because they do not test the strains of mold that are making you most sick".

The physician went on to explain that an ERMI (Environmental Relative Moldiness Index) sample was the only test that could help to identify if it was safe for her to live in her home environment. He then went on to recommend that the ERMI test should be done three to five weeks after the household was totally clean.

Sadly, this brief e-mail presented a number of challenges for her to work through. First and foremost was the fact that the contractor was at the end of the remediation project and was still trying to decide how to determine whether the project was completed properly. This is absolutely the wrong time to think about that. Determination of what criteria will be used to evaluate the effectiveness of a remediation project needs to be agreed upon before the work begins so that the contractor, the occupant, and even the doctor all know what is expected, and so that the project can be set up and completed with the best chance of meeting that goal. It is also important to segregate the assessment of the remediation process from an evaluation as to whether the entire house is acceptable for the occupant from a medical perspective. Unless the project involved whole house cleaning, using an ERMI sample to determine the general level of mold burden in the house would require the contractor to be responsible for things outside his contained work area.

This is why we recommend the collection of air samples using spore trap methods inside containments following remediation to judge the effectiveness of the work. The results of spore trap samples are compared to tough six-step criteria that have been published in a peer-reviewed journal and validated by over seven years of sampling by contractors and consultants across North America. But, regardless of the criteria chosen, the key is to have a clear end point before the project begins.

So, I was left to explain to the client that air samples and ERMI samples measure two different things. The ERMI, done weeks after the work, gives an overview of the home's condition. Removal of source material should improve the conditions, provided that the pre and post samples are collected in the same way from the same location(s). Air samples are used to ensure that contained work areas have been cleaned properly before allowing the air from those areas to mix with the air in other occupied spaces, thereby preventing cross contamination. Air samples can also be used to help evaluate the effectiveness of overall cleaning when the goal is to remove un-remediated or poorly remediated reservoirs of mold that have built up in a space.

Questions, Questions, Questions

Although I did not dig any deeper with the client discussed previously, I could have told her that the mold remediation industry has a long way to go before we gain clarity in regards to this seemingly simple issue of what is adequate remediation. I did not mention to her that I was currently involved in two separate voluntary groups grappling with some of these issues. Under the auspices of the IAQA there is an ad hoc committee trying to finalize a white paper on the apparently difficult question of whether negative air machines should be on or off while post-remediation samples are collected for mold remediation projects. And there is the group that has spent years trying to revise the IICRC S520 standard related to professional mold remediation. That group has been wrestling with another question that, on the face of it, seems straightforward: Who may collect samples to evaluate the effectiveness of mold remediation projects?

There is no real consensus on which analytical method should be used for specific types of samples, either air or surface. Boring in further, even if the sampling method (say, spore trap air samples) and an analytical technique (*e.g.*, preparation of the slides through staining and direct observation using plain light microscopy) is specified, there is currently little agreement on actual analytical procedures, with laboratories evaluating the slides at magnifications that typically range from 200X to 1000X. Similar industry squishiness is present when discussing surface samples (tape versus microvacuum), ATP samples (different numerical ranges for different meters), odor samples (what constitutes a fungal odor), and ERMI samples (vacuum collection or dust wipe collection).

No wonder some outside the mold remediation industry remain skeptical of the entire process. Until the industry can come together voluntarily or is forced to accept a regulatory mandate that answers the simple question of how we know that we have done a good job, the industry will never have the acceptance and stability enjoyed by those groups that are dealing with similar microscopic contaminants.

About the Author

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