

ARKANSAS MOLD INVESTIGATION ADVISORY BOARD

FINAL REPORT FOR ACT 341 OF 2011

November 2012

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ARKANSAS MOLD INVESTIGATION ADVISORY BOARD

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I. EXECUTIVE SUMMARY

Arkansas Act 341 of 2011 created the Mold Investigation Advisory Board (hereafter referred to as the "Advisory Board"). The Advisory Board is charged with studying: 1) the effects on the public health and safety of existing statutes and rules regarding mold investigations and remediation and 2) approaches to changing existing statutes to better meet the needs of Arkansas citizens. The Advisory Board consists of nine (9) members as follows:

One (1) member of the Senate appointed by the President Pro Tempore of the Senate;

One (1) member of the House of Representatives appointed by the Speaker of the House of Representatives;

Seven (7) members appointed by the Governor as follows:

One (1) to represent the State Plant Board;

One (1) member to represent the Department of Health;

One (1) member to represent the Department of Labor;

One (1) member to represent the Arkansas Realtors Association;

One (1) member to represent the Arkansas Association of Real Estate inspectors;

One (1) member to represent the Arkansas Pest Management Association; and

One (1) member who is a licensed mold inspector.

The main goals of the Advisory Board were to summarize and assess existing information relevant to the tasked listed in Act 341 of 2011 and to assess the feasibility of possible recommendations for any further actions to be taken by the state legislature or state agencies based on the Board's findings. To achieve these goals, the Advisory Board's activities were organized into four main focus areas: 1) health effects associated with exposure to molds in indoor environments; 2) exposure limits and assessment of mold in buildings; 3) approaches to mold mitigation and remediation; and 4) the feasibility and practicality of developing codes, regulations and/or other guidance that relate to mold problems inside buildings.

The full Advisory Board met four times to obtain and discuss technical information and formulate recommendations. The Advisory Board's Chairman and Vice-Chairman also met for three (3) additional working meetings for the purpose of drafting and reviewing technical documents. Supporting information was obtained from peer-reviewed scientific literature and other technical documents. Facts sheets and guidance documents produced by the Advisory Board were discussed and accepted by a majority of its members.

Finally, the Advisory Board was tasked to report its findings and proposals for new legislation to: 1) the State Plant Board; 2) the chair of the House Committee on Public Health, Welfare and

Labor and the chair of the Senate Committee on Public Health, Welfare and Labor; and 3) the Governor.

In response to concerns about mold and the gaps in scientific knowledge, the Advisory Board has attempted to gather information about the problems associated with mold contamination; make recommendations for reducing the number and magnitude of mold contamination problems in Arkansas and assess the feasibility of developing rules and regulations to address the problems associated with mold in indoor environments. Many of the observations, conclusions and recommendations of this Board are consistent with or nearly identical to those made by Advisory Boards and Task Forces in other states such as New York, California and Colorado. Wherever applicable, lessons learned and best practices from other jurisdictions have been incorporated into this report.

After discussions among Board members and input from stakeholders, the Mold Investigation Advisory Board does NOT currently recommend the implementation of state legislation or enforceable regulations to address the issues associated with the assessment and remediation of mold in indoor environments. The specific findings and recommendations of the Board are discussed herein.

II. MOLD INVESTIGATION ADVISORY BOARD FINDINGS

Numerous peer-reviewed studies indicate that molds found growing inside buildings that have moisture problems are not unique to those buildings or any other buildings. They are basically the same molds that can be found in the air outside. Molds are ubiquitous in our environment. Everyone is exposed to some mold on a daily basis. Outside, molds grow anywhere where there is moisture and organic material present. There is always some mold in the air and on most surfaces. Molds are present in all soils. Mold spores can enter an indoor environment through open doorways, windows, heating, ventilation and air conditioning systems. Mold spores attach themselves to clothing, shoes and bags and are brought in as people enter a building. Most certainly, there are actively growing molds in drain pipes, the moist soil of potted plants and on carpets, curtains, linens, clothing, papers and books that have absorbed moisture from the air and hold that moisture for extended periods of time. Therefore, under the most ideal conditions we are all exposed to a certain level of molds.

Inside a building, mold growth occurs when spores are deposited in an area where there is moisture from water damage, high humidity, water leaks, condensation, water infiltration and/or flooding. There is likely to be mold growth in areas where the floors and walls stay wet. In any building where moisture problems exist, there is the potential for mold growth inside the

building. Mold can grow almost anywhere; requiring only oxygen, water and a food source. The availability of moisture is the primary factor that controls mold growth indoors, since the nutrients and temperature range that molds need are usually present. Mold spores are constantly entering buildings in the air through openings such as doors, windows and ventilation systems. Molds reproduce by releasing tiny spores that float through the air. The mold will grow when airborne mold spores land on a damp “food source”. A food source can be almost anything, including: wood, paper, carpet, foods and insulation. Therefore, controlling the moisture is the key to managing mold inside a building.

Sampling for molds inside a building; is it necessary? The U.S. Centers for Disease Control and Prevention (CDC) does not recommend routine sampling for molds. Generally, it is not necessary to identify the species of mold growing in a building. Measurements of mold in air or on specific surfaces are not reliable or representative. Testing for mold is expensive and there are no standards for “acceptable” levels of mold in indoor environments. If mold is seen or smelled, then mold is present and regardless of what type of mold is present, it should be removed. Sampling methods for molds are not well standardized and may result in highly variable data that can be difficult to interpret. Currently, standards for judging what are and what are not acceptable or tolerable quantities of mold have not been established.

Will the molds that had been growing inside the building because of moisture problems cause the building occupants to become ill? The presence of mold inside a building does not mean that any occupants will inevitably experience adverse health effects. Most healthy individuals have few or no adverse reactions to the presence of mold spores commonly found in damp buildings. There may be certain individuals among the building occupants who are allergic to molds just as there are those who are allergic to pollen or animal dander. These persons may exhibit hay fever-like allergy symptoms when exposed to even very low concentrations of molds. Also, certain individuals with chronic respiratory disease (chronic obstructive pulmonary disease, asthma, etc.) may experience difficulty breathing when exposed to molds. Persons with immune suppressed conditions may be at increased risk for infections from molds. Persons who have these health conditions should discuss with their physicians the potential health effects of exposure to molds.

If there are continued complaints of allergy-type symptoms by occupants after the water problem has been fixed and the mold has been remediated, other allergens commonly found in indoor environments such as dust, insect pests such as cockroaches and dust mites, potted plants, potpourri, air fresheners, decorative candles, food and cleaning chemicals should also be evaluated for their contributions to allergic responses. Common signs and symptoms

associated with allergens may include coughing, postnasal drip, sneezing, congestion, itchy eyes, nose and throat, conjunctivitis and watery eyes.

What is “Toxic Mold” or “Black Mold”? A mold called *Stachybotrys* has been colloquially referred to as “black mold” or “toxic mold”. This label became widespread during the middle 1990’s perpetuated by the news media, insurance representatives and some contractors. The CDC reports state that the term “toxic mold” is not accurate. While certain molds are toxigenic, meaning that they can produce toxins, the molds themselves are not toxic or poisonous. *Stachybotrys* is a greenish-black, slimy mold found only on cellulose-rich products such as paper or wood that has remained wet for several days or more. *Stachybotrys* does not grow on concrete, linoleum or tile. Not all molds that appear to be black are *Stachybotrys*. The known health effects associated with exposure to *Stachybotrys* are similar to those caused by other common molds. The CDC recommends that *Stachybotrys* should be considered the same as other common molds that are found in indoor environments.

Even in the absence of health complaints, mold growth in any indoor environment should be prevented and its presence is indicative of problems associated with excess moisture. The most effective ways to prevent mold growth are to eliminate moisture intrusion and keep the relative humidity inside the building within the range of 30 to 50%, but no higher than 55%. To minimize mold growth inside a building, the building should be inspected regularly for signs of mold, moisture and leaks. Steps that should be taken if a leak or moisture problem is identified are as follows.

- First and most importantly, find the source of the moisture problem or leak and make repairs.
- Identify where mold is growing.
- Mold can be removed from hard or impermeable surfaces such as tile, concrete or vinyl with water and detergent or a 1:10 dilution of household bleach in water.
- If the mold cannot be cleaned or if the moldy materials are badly damaged, they will need to be removed.
- Make sure that all materials are dry.

If the moisture problem is eliminated; the mold is removed, either by cleaning or material replacement and the water problem does not reoccur, mold growth should not reoccur.

Indoor air quality is not a simple, easily defined concept such as air movement or a leaky faucet. It is a constantly changing interaction of a complex set of factors. The overall quality of the air inside a building, such as a house, office building or school, can be determined or influenced by

a variety of factors such as the size and overall configuration of the space, the building materials, the number of occupants, the activities of the occupants, the amount of ventilation available and physical parameters such as temperature and humidity. The environment outside the building can also play a role in the quality of the indoor air. For instance, materials used for landscaping and groundcover can enter a building through air vents and open doors. This also holds true for exhaust from vehicles idling in parking lots, driveways and garages. Even the sturdiest, most well-built structures can develop moisture problems.

When moisture problems do occur inside a building, the occupants should report them to those persons responsible for building maintenance and repair. Occupants should see their doctors for proper diagnosis and treatment of health problems that they believe are associated with the indoor air quality of the home or workplace. Managers and building owners should encourage occupants to seek medical advice for proper diagnosis and treatment. Building managers should: 1) evaluate potentially occupied areas for evidence of mold and dampness; 2) repair leaks and remediate water damaged materials; and 3) communicate with occupants about areas of the building with evidence of mold or moisture damage and provide the status of remediation plans and activities. Prompt attention to potential indoor air quality problems and open communication between owners/managers and occupants are keys to maintaining a healthy indoor environment.

III. SUMMARIES OF THE FINDINGS OF THE MOLD INVESTIGATION ADVISORY BOARD

Mold in Indoor Environments

- Mold growth in a building is a symptom of water intrusion or moisture problems. Any actions intended to prevent mold growth in buildings should focus on prevention of water or moisture problems.
- When water damage or moisture problems occur in buildings, efforts and resources should be focused on mitigating the water or moisture source and effectively cleaning or removing affected building materials that are or could be sources of mold growth.
- Some mold spore exposure is unavoidable because mold grows naturally in all outdoor environments. Mold spores are regularly found in indoor air and on surfaces and materials. There are a large number of species and genera, and those most typically found indoors varies by geographic area, climate, season and other factors.
- Dampness in buildings can promote other exposures aside from mold such as bacteria, dust mites, cockroaches and the release of chemicals associated with some building materials.
- A realistic objective for building owners and managers, including homeowners, is to maintain buildings so that indoor materials and surfaces remain dry and water problems are mitigated promptly.

- There is no credible scientific evidence to support distinctions between a category of “toxic mold” species versus other “non-toxic” mold species or between “toxic mold” health effects and health effects associated with other molds.

Health Effects

- Exposure to building dampness and dampness-related agents including mold has been recognized nationally and at the state and local levels as a potential public health concern.
- The mere presence of mold growth does not necessarily indicate that people present in the area will exhibit adverse health effects.
- The strongest evidence exists for associations between indoor mold exposures and upper and lower respiratory health effects such as nasal symptoms and asthma exacerbation.
- Asthma and other allergic respiratory diseases that can be exacerbated by mold exposures are common. Therefore, many people are at risk for exacerbation of their respiratory conditions by exposure to mold condition in buildings.
- Evidence for associations between non-respiratory effects and mold exposures in buildings is very limited and does not support any related health effects conclusions.
- Molds, along with other organisms such as bacteria, mites and insects that proliferate in damp environments, produce volatile compounds, spores and other minute particles that can cause irritant and allergic responses that range from annoying to serious depending on the amount of exposure and the general health and sensitivity of the individual. Although some molds produce toxins, their contribution to adverse health effects in damp buildings, based on existing scientific information is uncertain.
- Factors that influence the likelihood that individuals might experience health effects following exposures to molds in indoor environments include: the nature of the fungal material (e.g., allergenic, toxic/irritant, or infectious); the extent of exposure (amount and duration); and the susceptibility of the exposed people.
- Susceptibility varies with genetic predisposition, age, state of health, concurrent exposures and previous sensitizations.
- It is not possible to determine “safe” or “unsafe” levels of exposure for the general population because of variation of individual susceptibility, lack of standardized and validated environmental exposure sampling methods, and lack of reliable biological indicators.

Exposure Limits

- The development of reliable, health-based quantitative mold exposure limits is not currently feasible due to a number of technical challenges. Many other state, federal and international expert panel reports have reached similar conclusions.
- The technical challenges to the development of reliable quantitative exposure limits for building clearance should not preclude the use of qualitative clearance guidance for water damage and mold remediation. Qualitative guidance focuses on correcting water damage and mold growth and cleaning or removing sources of overabundant mold growth on building surfaces and furnishings regardless of the type of mold.

Environmental Assessment

- The presence of mold growth, water damage or musty odors should be addressed immediately.
- All water sources should be identified and corrected.
- Water damage and mold growth should be assessed.
- A thorough visual inspection is the most important initial step in identifying mold problems and developing cleanup strategies.
- Decisions can usually be made about appropriate remediation strategies based on a comprehensive visual inspection without the need for environmental sampling.
- If sampling is performed, a sampling plan should include a clear purpose, sampling strategy and guidance for interpretation of results.

Mold Control and Remediation

- The goal of remediation is to remove or clean mold-damaged materials using work practices that protect occupants by controlling the dispersion of mold from the areas being cleaned and protect cleanup workers from exposures to mold.
- Always, the underlying moisture problem must be corrected to prevent recurrence of mold growth.
- Properly trained workers should be familiar with topics such as: causes of moisture intrusion and mold growth; health concerns related to mold exposure; use of appropriate personal protective equipment; and mold remediation work practices, procedures and methods.
- Non-porous materials such as glass or metals can almost always be cleaned.
- Semi-porous or porous structural materials such as wood or tile can be cleaned if they remain structurally sound.
- Porous materials such as carpet or insulation should be removed and replaced if they have sustained significant damage.

- Moldy areas and items should be cleaned with detergent and water using the gentlest cleaning method available to minimize the amount of material that becomes airborne.
- Use of disinfectants is not normally necessary to attain effective remediation because the removal of fungal growth is the ultimate goal.
- Use of gaseous, vapor-phase or aerosolized biocides is not recommended. The use of aerosolized biocides can pose significant health hazards for persons in close proximity to the treated areas or those returning to the treated spaces.

IV. MOLD INVESTIGATION ADVISORY BOARD CONCLUSIONS AND RECOMMENDATIONS

There are a number of barriers that need to be overcome in investigating the possible effects of molds on public health. There are no accepted standards for mold sampling in indoor environments or for analyzing and interpreting the data in terms of human health. Molds are ubiquitous in the environment and can be found almost anywhere samples are taken. It is not known what quantity of mold is acceptable in indoor environments with respect to health. Because of difficulties related to sampling for mold; most conclusions made about levels of indoor molds are based primarily on baseline environmental data rather than human dose-response data. For these reasons, and because individuals have different sensitivities to molds, setting standards and guidelines for indoor mold exposure levels is difficult and may not be practical.

Public Outreach and Education: The public is exposed to enormous amounts of so-called “scientific information” via the news media and the Internet as well as by word of mouth about what an occupant or home owner ought to do if they find mold growing in their indoor environments. Most of these reports and articles are not peer reviewed and peppered with unsubstantiated conclusions, often times, purposefully or unwittingly creating fear and panic. Until the general public gains a realistic perspective about the molds that they encounter in their indoor environments that will help them sort through the misinformation and misguided conclusions, it will be difficult for residents with mold problems to assist in decision-making and learn to use a common-sense approach to solving mold-related problems and they will lack the basic knowledge to solve those problems.

The Board recommends that resources should be channeled toward informing and educating the public about molds that they encounter in indoor environments. Some of the most common questions asked are:

- Why is mold growing inside my residence/office?
- What is “black” or “toxic” mold?

- How will exposures to these indoor molds affect my health?
- Who is most vulnerable to molds found inside buildings?
- Should I have my house/office building tested for mold?
- How do I get rid of the mold?
- Will the mold come back?
- Can I do the cleanup myself or do I have to hire a contractor?

Education and outreach messages for the general public should emphasize that potential health effects associated with dampness and subsequent mold growth inside buildings can be reduced by correcting water problems and removing sources of indoor mold growth as quickly as possible.

To facilitate education and outreach, the Board has developed a Mold Information Sheet that attempts to address each of these questions. A copy of the Mold Information Sheet is attached to this report as Attachment A. It can be made available to the public as a hard copy or it can be posted on the websites of the various agencies and organizations affiliated with the Mold Investigation Advisory Board. The Information Sheet can be disseminated electronically to offices of city inspectors, school districts, building managers and anyone else who thinks that they have a mold problem in their living areas. Anyone who has questions about the materials presented in the Fact Sheet or requires additional information is directed to contact Shirley Louie, M.S., CIH, Branch Chief for Applied Epidemiology and the Deputy State Epidemiologist with the Arkansas Department of Health. Ms. Louie will keep a log of the numbers and types of calls received in an effort to evaluate the effectiveness and utility of the Mold Information Sheet.

Technical Guidance for Mold Remediation/Abatement Contractors: Mold remediation is also referred to as mold abatement. It is not always necessary to hire a contractor to remediate mold in a building. However, hiring a qualified contractor may be advisable if the mold contamination is extensive, involves complicated cleanup strategies or if the owners are unable to do the cleanup themselves. Determining the most effective strategies for mold prevention and remediation in the absence of federal standards will require adherence to best practices gleaned from experience in the field by knowledgeable professionals.

Although there are currently no rules or regulations that address the credentialing of mold abatement/remediation contractors in Arkansas, the Advisory Board felt that sufficient scientific and technical information was available to develop guidelines based on the best available technology and best practices.

The Mold Advisory Board has drafted a guidance document entitled: “Arkansas Guidelines for Mold Abatement Contractors”. Mold abatement professionals and the general public will be able to obtain this document from the websites of the Arkansas Department of Health, the Arkansas Plant Board, the Arkansas Department of Labor, and the Arkansas Realtor’s Association. A copy of the Guidance Document is attached to this report as Attachment B.

This guidance document, intended for contractors performing mold abatement, provides basic tenets concerning mold in indoor environments; professional training and certification; environmental assessment; remediation of structural and mechanical systems; and health, safety and hazard communications. The information contained in the document would also be useful for property owners and managers who are responsible for addressing mold problems. This guide can be used to help determine whether professional assistance is needed; what activities should be part of a remediation plan and what questions should be answered before remediation is started.

Anyone who has questions about the materials presented in the guidance document or requires additional information is directed to contact Shirley Louie, M.S., CIH, Branch Chief for Applied Epidemiology and the Deputy State Epidemiologist with the Arkansas Department of Health. Ms. Louie will keep a log of the numbers and types of calls received in an effort to evaluate the effectiveness and utility of the Arkansas Guidelines for Mold Abatement Contractors.

Future Actions Pertaining to the Establishment of Regulatory Standards and Licensing of Mold Inspectors and Mold Abatement Contractors in Arkansas.

Three questions are almost always asked when the public seeks advice and guidance from health professionals and environmental consultants.

1. How much mold is too much mold?
2. Will the mold growing inside my home make me or my family sick?
3. How do I get rid of the mold that is growing in my home?

Currently, no federal or Arkansas state agency is specifically authorized to regulate exposure to indoor mold growth. The Occupational Safety and Health Administration (OSHA) General Duty Clause and Hazard Communication Standard have sometimes been invoked to resolve indoor microbial growth problems in non-industrial workplaces. However, enforceable numerical standards or regulations specifying acceptable concentrations of molds in indoor air have not been defined. How much mold is too much mold and will the mold make anyone sick will

depend on specifics such as the people exposed, the environment and the molds that are growing in that environment. The lack of meaningful exposure limits for molds is a major obstacle to establishing regulatory standards. Until microbiological methods for demonstrating mold concentrations in the environment are standardized and reproducible, epidemiological studies necessary to determine dose-response can only suggest association, not cause and effect, when addressing mold exposures and health effects. Health professionals may be able to determine the health effects associated with an individual's exposure to a specific mold; but there is little consensus when it comes to describing the effects of a variety of molds on a general population.

The absence of standards, coupled with the deluge of misinformation that the public is exposed to results in a general population that finds it difficult to decide what information is credible and how they can use that information to solve their mold problems. Unable to understand or define their mold problems, the public looks for "qualified" professionals to help them fix whatever it is that is causing mold to grow in their homes. Trying to find companies and technically competent persons who can help solve the problems can be challenging.

In 2009, the 87th Arkansas General Assembly passed Act 1467 entitled "An Act to License Mold Investigators; to Establish Standards for Mold Investigations; to establish qualifications for Mold Investigators; and for Other Purposes". Ultimately, both those performing mold investigations and those requiring their services found the specifics of the Act to be vague and difficult to interpret. Consequently, the 88th Arkansas General Assembly repealed the Act in 2011 with the enactment of Act 518 entitled "An Act Repeal the Arkansas Mold Investigator Licensing Act; and For Other Purposes".

The Mold Investigation Advisory Board Makes the Following Recommendations

- 1. As a result of discussions among Board members and input from stakeholders, the Mold Investigation Advisory Board recommends that, at this time, no state legislation or enforceable regulations be implemented to address the issues associated with the assessment and remediation of mold in indoor environments.**
2. Although much has been written about molds in indoor environments, at this time, there is insufficient knowledge of the problems and issues related to mold in indoor environments that are relevant to the citizens of Arkansas. Calls received by agencies such as the Arkansas Department of Health, the Arkansas Plant Board and the Arkansas Department of Labor indicate that the public generally does not have a sufficient knowledge base to be able to make informed decisions about solving mold problems in their homes and in other buildings.

Often times, when the public seeks out guidance about mold in indoor environments and the health effects associated with exposures to molds, they are unable to find credible, peer-reviewed information. However, the lack of enforceable regulations does not mean that the public should not be offered guidance to help them make informed decisions and develop practical solutions to their mold problems. The Mold Investigation Advisory Board has developed a Mold Information Sheet described earlier in this report and recommends that this Information Sheet be made available to the public via postings on the websites of state agencies such as the Arkansas Department of Health, the Arkansas Plant Board and the Arkansas Department of Labor as well as those of organizations such as the Arkansas Realtors Association, Arkansas Pest Management Association and the Arkansas Association of Real Estate Inspectors.

3. When those with mold problems search for environmental professionals to help them decide what they should do to remediate the problem, finding a company with the training and credentials necessary to inspect for and abate mold inside buildings can be difficult. The consensus of the Board members is that mold inspectors should not only be knowledgeable about molds that are found growing inside buildings but should also be able to offer guidance to the property owner/manager about the moisture problem that is allowing the mold to grow and the steps that should be taken to mitigate the water problem and consequently the mold growth. In an effort to help those persons and companies that are interested in performing mold investigations and mold abatement, the Mold Investigation Advisory Board has developed a Guidance document entitled: "Arkansas Guidelines for Mold Abatement Contractors".

The Board recommends that this guidance document be made available to the public via postings on the websites of state agencies such as the Arkansas Department of Health, the Arkansas Plant Board and the Arkansas Department of Labor as well as those of organizations such as the Arkansas Realtors Association, Arkansas Pest Management Association and the Arkansas Association of Real Estate Inspectors. The information presented offers specific guidance about preferred work practices for mold assessment and remediation.

4. In order to monitor the usefulness and effectiveness to the public of the Mold Information Sheet and the Guidance Document for Mold Abatement Contractors, the Board recommends that the Mold Investigation Advisory Board be allowed to remain active. The Board recommends that the Mold Investigation Advisory Board be allowed to remain

active as an Ad Hoc committee reporting to the Arkansas State Plant Board. The purpose of the committee would be to:

- To monitor the usefulness and effectiveness to the public of the Mold Information Sheet and the Guidance Document for Mold Abatement contractors.
- When needed, to revise the Mold Information Sheet and the Guidance Document of Mold Abatement contractors to reflect current science.
- Make other recommendations related to Mold investigations.

Ms. Louie is listed as the contact person on both documents and would compile information about the most frequently asked questions, what information contained in each of the documents was helpful and what information was lacking. Also, a contractor or technical consultant might be hired to review and update guidance materials and review third-party training curricula or industry certification programs. A list of training programs can be made available to those interested in medication/abatement work. Compiling and analyzing new and emerging information about mold in indoor environments, training and remediation technologies will require dedicated resources. Estimates of the costs required to implement and sustain these activities can be provided.

A summary of the information gathered from interactions with the general public and contractors could be presented to the Board at least once a year for the next two years and at the end of that period, sufficient information should be available to develop additional guidance or regulations of mold assessment and remediation companies and individuals.

V. REFERENCES AND RESOURCE MATERIALS

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ATTACHMENT A

ARKANSAS MOLD INFORMATION SHEET

MOLD INFORMATION SHEET

THE FACTS ABOUT MOLDS IN INDOOR ENVIRONMENTS

What are molds?

Molds are simple, microscopic organisms, present virtually everywhere, indoors and outdoors. Molds, along with mushrooms and yeast, are fungi and are needed to break down dead material and recycle nutrients in the environment. For molds to grow and reproduce, they need only a food source – any organic material, such as leaves, wood, paper or dirt – and moisture. Because molds grow by digesting the organic material, they gradually destroy whatever they grow on. Mold growth on surfaces can often be seen in the form of discoloration, frequently green, gray, brown or black but also white and other colors. Some of the most common indoor molds are *Cladosporium*, *Penicillium*, *Aspergillus*, and *Alternaria*.

How am I exposed to indoor molds?

Molds release countless tiny, lightweight spores, which travel through the air. Everyone inhales some mold every day without apparent harm. It is common to find mold spores in the air inside homes. In fact, most of the airborne spores found indoors come from outdoor sources. Mold spores primarily cause health problems when they are present in large numbers and exposures are high. This may occur when there is active mold growth within a home, office, school or other building in which people live or work for long periods. People can also be exposed to mold by touching contaminated materials or eating contaminated foods.

Can mold become a problem in my home?

Yes. Molds will grow and multiply anywhere, when sufficient moisture is available and organic material is present. Be on the lookout for the following common sources of moisture inside and outside your home that may lead to mold problems:

- Flooding
- Leaky roof; improper flashings
- Sprinkler spray hitting the house
- Plumbing leaks and overflow from sinks and sewers
- Damp basement or crawl space
- Improper grading and lack of downspout extensions
- Steam from showers, cooking or humidifiers
- Wet clothes hung to dry indoors or a clothes dryer that exhausts indoors
- Condensation from air conditioners
- Refrigerator ice maker water supply lines
- Consult a company trained or certified in the inspection for and remediation of mold for additional information

Other signs of moisture problems include warping floors and discoloration of walls and ceilings. Condensation on windows and walls is also an important indicator; however, it can also be caused by an indoor combustion problem. Fuel-burning appliances such as water heaters should be routinely inspected by your local utility or a professional technician.

Should I be concerned about mold in my home?



Arkansas Department of Health



Yes. If indoor mold contamination is extensive, it can cause very high and persistent airborne spore exposures. Persons exposed to high spore levels can become sensitized and develop allergies to the mold or other health problems. Mold growth can damage your furnishings, such as carpets, upholstery, cabinets and drapes. Mold can be found growing on clothes and shoes stored in damp closets. Over time, unchecked mold growth can cause serious damage to the structural elements in your home.

HEALTH EFFECTS

What symptoms can molds cause?

Molds produce health effects through inflammation, allergy or infection. Allergic reactions are the most common occurrences following exposures to high concentrations of molds. Typical symptoms that people exposed to molds report (alone or in combination) include:

- Respiratory problems, such as wheezing, difficulty breathing and shortness of breath
- Nasal and sinus congestion
- Eye irritation (burning, watery or reddened eyes)
- Dry, hacking cough
- Nose or throat irritation
- Skin rashes or irritation

How much mold can make me sick?

It depends. Most otherwise healthy people have no responses to molds unless the spore levels are excessively high. For others, a relatively small number of mold spores can trigger an asthma attack or lead to other health problems. However, mold should not be growing inside a building and its sustained growth can be unhealthy. Basically, if you can see or smell mold inside your home, school or office building, you should take steps to identify and eliminate the excess moisture and clean up or remove the mold.

Are some molds more hazardous than others?

Perhaps. Allergic persons vary in their sensitivities to mold both as to the amount and the types to which they react. In addition to their allergic properties, some indoor molds, such as *Fusarium*, *Trichoderma* and *Stachybotrys*, may produce compounds that have toxic properties, which are called mycotoxins. Mycotoxins are not always produced, and whether a mold will produce mycotoxins while growing in a building depends on what the mold is growing on, conditions such as temperature, humidity, pH or other unknown factors. When mycotoxins are present, they occur in both living and dead mold spores and may be present in materials that have become contaminated with molds. The term "toxic mold" is not accurate. While certain molds do produce mycotoxins, the molds themselves are not toxic or poisonous. The Centers for Disease Control and prevention (CDC) recommends that hazards presented by molds that may produce mycotoxins should be considered the same as other common molds that can grow in your building. All molds should be treated the same with respect to potential health risks and removal.

Who is at greater risk when exposed to mold?

Exposure to mold is not healthy for anyone inside buildings. Therefore, it is always best to identify and correct high moisture conditions quickly before mold grows and health problems develop. Some people may have more severe symptoms or become ill more rapidly than others:

- Individuals with existing respiratory conditions, such as allergies, chemical sensitivities, or asthma.
- Persons with weakened immune systems, such as people with HIV infection, cancer chemotherapy patients, and others with chronic diseases.
- Infants and young children.

- The elderly.

If you believe that you or your children have symptoms that you suspect are caused by exposure to mold, you should see a physician. Keep in mind that many symptoms associated with mold exposure may also be caused by many other illnesses.

MOLD DETECTION

How can I tell if I have mold in my house?

You may suspect that you have mold if you see discolored patches or cottony or speckled growth on walls, ceilings or furniture or if you smell an earthy or musty odor. You may also suspect mold contamination if mold-allergic individuals experience some of the symptoms listed above when in the house. Evidence of past or ongoing water damage also should trigger a more thorough inspection for damp conditions. You may find mold growth underneath water-damaged surfaces or behind walls, floors or ceilings.

Should I test my home for mold?

The Arkansas Department of Health and the CDC do not recommend testing as a first step to determine if you have a mold problem. Reliable air sampling for mold can be expensive and requires expertise and equipment that is not available to the general public. Owners of individual private homes and apartments usually will need to pay a contractor to perform such sampling, because insurance companies and public health agencies seldom provide this service. Some mold inspection contractors also provide remediation (clean up) services, which can be expensive. Some contractors may have a financial interest in detecting mold for the purpose of acquiring clean up business. Mold inspection and cleanup is usually considered a housekeeping task that is the responsibility of the homeowner or landlord, as are roofing and plumbing repairs, house cleaning and yard maintenance.

Another reason that testing is not recommended for mold contamination is that there are few available standards for what is an acceptable quantity of mold. In all locations, there is some level of mold outdoors. If sampling is carried out in a home, an outdoor sample also must be collected at the same time as the indoor sample, to provide a baseline measurement. Because individual susceptibility varies so greatly, sampling is at best a general guide.

The simplest way to deal with a suspicion of mold contamination is: If you can see or smell mold, you likely have a problem and should take the steps outlined below. Mold growth is likely to recur unless the source of moisture that is allowing the mold to grow is removed and the contaminated area is cleaned.

GENERAL CLEANUP PROCEDURES

Currently there are no State of Arkansas or Federal laws or regulations requiring property owners to remediate (clean up) the presence of mold in buildings. If mold is present inside a building prompt remediation is recommended but ultimately is the option of the building owner and/or occupant of the building. The following is intended as an overview for homeowners and apartment dwellers. For additional information, consult the more detailed documents list in the **USEFUL PUBLICATIONS** section.

Judging how large a problem you have

Small mold problems – total area less than 10 square feet can be handled by the homeowner or apartment maintenance personnel using appropriate personal protective equipment (see below). Large contamination problems – areas greater than 100 square feet, may require an experience professional

contractor. For in-between situations, the type of containment and personal protection will be a matter of judgment.

Can mold cleanup activities be hazardous to my health?

Yes. During the cleanup process, you may be exposed to mold, strong detergents, and disinfectants. Spore counts may be 10 to 1000 times higher than background levels when mold-contaminated materials are disturbed. Take steps to protect you and your family's health during cleanup:

- When handling or cleaning moldy materials, it is important to use a respirator to protect yourself from inhaling airborne spores. Respirators can be purchased from hardware stores; select one that is effective for particle removal (sometimes referred to as an N-95 particulate respirator). However, respirators that remove particles will not protect you from fumes (from cleaning materials). Minimize exposure when using bleach or other disinfectants by ensuring good ventilation of the area.
- Wear protective clothing that is easily cleaned or discarded.
- Use rubber gloves.
- Try cleaning a test area first. If you feel that this activity adversely affected your health, you should consider paying a contractor or other experienced professional to carry out the work.
- Ask family members or bystanders to leave the areas that are being cleaned.
- Work for short time periods and rest in a location with fresh air.
- Air out your house well during and after the work.

What can I save? What should I toss?

Discard items from which it will be difficult to remove mold completely. Solid materials generally can be kept after they are cleaned thoroughly.

- First, fix the moisture problem and remove excess water.
- A wet/dry vacuum cleaner may help remove water and clean the area.
- Discard porous materials such as ceiling tiles, sheetrock, carpeting and wood products.
- Contain the area in which you work to reduce the spread of dust to other areas; for example, close the door or use plastic sheets to separate the room and run a suction fan that exhausts the air outdoors.
- Because spores are more easily released when moldy materials dry out, it is advisable to remove moldy items as soon as possible. If there was flooding, sheetrock should be removed to a level above the high-water mark. Visually inspect the wall interior and remove any mold-contaminated materials such as insulation.
- Carpet is often difficult to clean thoroughly, especially when the backing or padding is moldy, in which case, it should be discarded.
- Bag and discard moldy items. Items can be disposed of as household trash.
- Clean nonporous materials such as glass, plastic, metal and ceramic tiles.
- Wear gloves, an N-95 respirator, and eye protection.
- Use a non-ammonia soap or detergent, or a commercial cleaner, in hot water, and scrub the entire mold-affected area.
- Use a stiff brush or cleaning pad on cement-block walls and other uneven surfaces.
- Rinse cleaned items with water and dry thoroughly.

Disinfection of contaminated materials

Disinfecting agents can be toxic for humans as well as molds, therefore, they should be used only when necessary and should be handled with caution. Disinfectants should be applied only to thoroughly cleaned materials to ensure that the mold has been killed.

- Wear gloves and eye protection when using disinfectants and ventilate the area well.

- A 10% solution of household bleach can be used as a disinfectant. Use 1½ cups of household bleach per gallon of water.
- When disinfecting a large structure, make sure that the entire surface is wetted, for example, the floors, joists and posts.
- Keep the disinfectant on the treated material for a prescribed time before rinsing or drying. Ten minutes is typically recommended for a bleach solution.
- Properly collect and dispose of extra disinfectant and runoff.
- Using bleach straight from the bottle is actually LESS effective than diluted bleach.
- Bleach fumes can irritate the eyes, nose and throat. Make sure that working areas are well ventilated.
- Never mix bleach with ammonia; toxic fumes may be produced.

Can air ducts become contaminated with mold?

Yes. Air duct systems can become contaminated with mold. Duct systems may be constructed of bare sheet metal, sheet metal with fibrous glass insulation on the exterior or sheet metal with internal fibrous glass liner, or they may be made entirely of fibrous glass. Bare sheet metal systems and sheet metal with exterior fibrous glass insulation can be cleaned and disinfected. If water damaged, ductwork made of sheet metal with an internal fibrous glass liner or made entirely of fibrous glass will often need to be removed and discarded. Ductwork in difficult-to-reach locations may have to be abandoned. If you have any other questions, contact an air duct cleaning professional or licensed contractor.

Can ozone air cleaners help remove mold or reduce odors?

The ADH and CDC strongly recommend that you NOT use an ozone air cleaner in any occupied space. Ozone is a strong oxidizing agent that is used to eliminate odors. However, ozone is a known lung irritant. Ozone generators have been shown to sometimes produce indoor level above the safe limit. It has been shown that ozone is not effective in controlling mold and other microbial contamination, even at concentrations far above safe health levels. Also, ozone may damage materials in the home, for example, cause rubber items to become brittle.

How can I prevent indoor mold problems in my home?

Inspect your home regularly for the indications and sources of indoor moisture and mold listed on page 1. Take steps to eliminate sources of water as quickly as possible. If a leak or flooding occurs, it is essential to act quickly.

- Stop the source of leak or flooding.
- Remove excess water with mops or wet vacuum.
- Whenever possible, move wet items to a dry and well ventilated area or outside to expedite drying. Move rugs and pull up areas of wet carpet as soon as possible.
- Open closet and cabinet doors and move furniture away from walls to increase circulation.
- Run portable fans to increase air circulation. Do not use the home's central blower if flooding has occurred in it or any of the ducts. Do not use fans if mold may have already started to grow – more than 48 hours since flooding.
- Run dehumidifiers and window air conditioners to lower humidity.
- Do not turn up the heat or use heaters in confined areas, as higher temperatures increase the rate of mold growth.
- If water has soaked inside the walls, it may be necessary to open wall cavities, remove the baseboards, and/or pry open wall paneling.

Useful Publications

US EPA. A Brief Guide to Mold, Moisture, and Your Home. www.epa.gov/mold/moldresources.html

US CDC. Mold homepage. www.cdc.gov/mold/default.htm

Facts about Mold and Dampness. www.cdc.gov/mold/dampness_facts.htm

US CDC. Facts about *Stachybotrys chartarum* and other Molds. www.cdc.gov/mold/stachy.htm

Mold Cleanup Fact Sheet. www.bt.cdc.gov/disasters/pdf/flyer-get-rid-of-mold.pdf

Local Assistance

This Fact Sheet has been prepared by the Arkansas Mold Investigation Advisory Board. The Board has also prepared a guidance document that will provide information on subjects such as mold and health, advice on assessment of mold in indoor environments, cleanup efforts and prevention of mold growth and additional links to other resources.

For additional information, contact:

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ATTACHMENT B

ARKANSAS GUIDELINES FOR MOLD ABATEMENT CONTRACTORS

Document Number ACMGD-AR11-2012

ARKANSAS GUIDELINES FOR MOLD ABATEMENT CONTRACTORS

I. INTRODUCTION

On April 10, 2009, the Governor of the State of Arkansas signed into law Public Act No. 1467, *An Act to License Mold Investigators; To Establish Standards for Mold Investigations; To Establish Qualifications For Mold Investigators; and For Other Purposes*. This act was repealed in 2011.

On February 23, 2011, the Arkansas General Assembly enacted Act 341, *An Act to Create the Mold Investigation Advisory Board; To Study Laws and Rules Regarding Mold Inspections and Remediation; and For Other Purposes*. As part of the mandate of this Act, the Mold Investigation Advisory Board has chosen to publish guidelines establishing mold abatement protocols that include acceptable methods for performance of Mold Investigation and Remediation within the State of Arkansas. These guidelines are not regulations. The intent of the *Arkansas Guidelines for Mold Abatement Contractors* is to fulfill, in part, the legislative mandate set forth in Act 341.

II. INTENDED AUDIENCE

The *Arkansas Guidelines for Mold Abatement Contractors* is intended to provide guidance to contractors performing mold abatement; provides basic tenets concerning mold in indoor environments; professional training and certification; environmental assessment; remediation of structural and mechanical systems; and health, safety and hazard communications. The information contained in this document would also be useful for property owners and managers who are responsible for addressing mold problems. This guide can be used to help determine whether professional assistance is needed; what activities should be part of the remediation process and what questions should be answered before remediation is started. It refers readers to information in the documents mentioned below, and to other reference materials. This guidance document is available for general distribution on the Arkansas Department of Health website [www.healthy.arkansas.gov] and may be useful to other professionals and the general public who are interested in indoor environmental quality (IEQ) and mold abatement.

III. BASIC TENETS CONCERNING MOLD IN INDOOR ENVIRONMENTS

Molds are a type of fungi. The terms *fungi* and *mold* are used interchangeably throughout this document.

The basic tenets listed below should be followed whenever there is a concern about mold:

- Find the source of the water
- Stop the water/ fix the leak
- Remove moldy materials
- Discard porous materials that have remained wet for over 48 hours
- Perform mold abatement as appropriate, according to an abatement plan designed for the particular site

The *Arkansas Guidelines for Mold Abatement Contractors* will refer to other guidelines for much of the detailed recommendations for mold remediation. These other guidelines have been written for building engineers, property managers, school officials, abatement contractors, and the public. They include guidelines written by the New York City Department of Health and Mental Hygiene, U.S. Environmental Protection Agency (EPA), the Canada Mortgage and Housing Corporation, Health Canada, and the Institute of Inspection Cleaning and Restoration Certification (IICRC).

IV. PROFESSIONAL INVOLVEMENT

A. Abatement Contractors

There are a number of types of professional contractors that perform various kinds of environmental abatement. These include environmental contractors such as those who perform lead, radon, and/or asbestos abatement, and restoration and cleaning contractors involved in water restoration, smoke and fire restoration, and carpet cleaning specialists. Before entering into the mold abatement business, any contractor should acquire professional training in this area, and become familiar with technical and reference materials referenced in this document.

B. Training

Contractors should be trained to use state-of-the-art techniques when performing mold abatement to keep building occupants and their own workers safe. The State of Arkansas does not offer training or licensure for mold abatement contractors. There are a number of

professional organizations and trade groups that have created credentialing and standards-setting programs in order to “self- police” the industry, in the absence of federal and state regulations. Below is a list of some of the national organizations offering training and credentialing in mold abatement. This list should not be considered comprehensive. It should be noted that the quality of the training one receives might vary greatly depending upon the organization sponsoring the training, the curricula, and the actual trainer.

- **Institute of Inspection, Cleaning and Restoration Certification (IICRC).** www.IICRC.org
- **Association of Specialists in Cleaning and Restoration (ASCR).** www.ascr.org
- **American Council for Accredited Certification (ACAC).** www.acac.org
- (Formerly the American Indoor Air Quality Council (AmIAQ)).
- **Indoor Air Quality Association (IAQA).** www.iaqa.org
- **Interactive Occupational Training (IOT).** www.iot-edu.com

One organization for contractors, the Institute for Inspection, Cleaning and Restoration Certification (IICRC), has published a voluntary standard for professional mold remediators called *IICRC Standard and Reference Guide for Professional Mold Remediation, S520*, first published in December 2003. The 2nd edition was approved by ANSI and released in late 2008. The *Arkansas Guidelines for Mold Abatement Contractors* refers readers to the most current version available of *IICRC S520* for a detailed discussion about the technical aspects of mold abatement that space does not allow for here. The Arkansas Mold Investigation Advisory Board recommends that as a minimum competency, all mold abatement contractors doing business in Arkansas should follow the principles and practices stated in the most current version of *IICRC S520*. Further, it is recommended that every mold abatement job site have a full-time supervisor at the jobsite who is formally trained to understand the principles and practices described in *IICRC S520*. Additionally, Mold Investigation Advisory Board recommends that all workers other than the job-site supervisor be adequately trained so that they understand the proper use of personal protective equipment (PPE), know how and when to use such equipment, and can work in a safe manner without causing harm to themselves, fellow workers and building occupants, or the building.

C. Third Party Oversight – The Industrial Hygienist/Indoor Environmental Professional

Third party oversight should be used whenever the mold abatement contractor has questions about how to abate a certain area, whether certain methods should be employed, or if unusual circumstances exist such as health considerations of building occupants, or questions about how

much of an area should be abated (i.e., half of the wall vs. the entire wall). Some specific examples of when third party oversight is recommended are:

- During mold abatement project(s) in a hospital, nursing home, rehabilitation facility or medical clinic;
- In any setting where there are immunocompromised persons;
- Where there has been raw sewage contamination and a determination must be made about what can be salvaged;
- Where an independent assessment is called for; or
- Where it is determined that it would be beneficial to collect samples based upon a hypothesis generated from a site assessment.

NOTE- the Industrial Hygienist/Indoor Environmental Professional (IH/IEP) should consult with their lab prior to going to the site for instructions on how the lab wants the samples collected and transported.*

*Laboratories should be accredited by the American Industrial Hygiene Association and be a current, successful participant in the Environmental Microbiology Laboratory Accreditation Program (EMLAP). EMLAP is specifically designed for labs identifying microorganisms commonly detected in air, fluids, and bulk samples during indoor air quality studies in a variety of settings. Participation assists the laboratory in maintaining high quality standards.

Note that if microbiological samples are to be collected and interpreted for the client, this should be performed by the IH/IEP and not the mold abatement contractor.

The Mold Investigation Advisory Board recommends that all individuals acting as consultants on mold abatement projects, whether they are industrial hygienists and/or independent environmental professionals, obtain training regarding indoor air quality and sampling for and interpretation of bacteria and mold in indoor environments.

The American Industrial Hygiene Association (AIHA) www.aiha.org, American Conference of Governmental Industrial Hygienists (ACGIH) www.acgih.org and American Council for Accredited Certification (ACAC) www.acac.org are some of the national organizations providing this type of training.

V. ENVIRONMENTAL ASSESSMENT

The first step in most mold investigations should be to take a building history. Answers to important questions like age of the building and of the roof, construction history, history of water damage, leaks/floods, and maintenance history helps the IH/IEP and mold abatement contractor gain a larger picture about the building, and may impact sampling and/or remediation strategies.

During the initial walkthrough, emphasis should be placed upon looking for evidence of water damage, because this is where mold is likely to be found. Taking note of musty, moldy odors is often a good way to begin an investigation and head towards the direction of the source of the odor (mold). The source of the water must be found and stopped *immediately*, moldy materials must be removed and replaced (if porous), the area must be dried, and abatement must take place according to these guidelines.

Decisions about appropriate remediation strategies are not always reliably made based upon visual inspection alone. Mold may be growing in places that are not readily observable, such as on the reverse side of wallboard panels, inside of wall cavities, and inside of HVAC systems. This is what is often referred to as “hidden mold”. Hidden mold should be remediated along with mold that is readily visible. Other tools in addition to our senses of sight and smell may be employed to alert the mold abatement contractor to the presence of hidden mold. Some of these are discussed briefly below.

A. Visual Inspection

Visual inspection of the property may be conducted by the mold abatement contractor, third party consultant (IH/IEP), or both. According to the NYC *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*:

“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), wallpaper, 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.”

Thermal imaging can also be used to look for gaps in insulation and can be useful in predicting areas in the building where condensation will likely form, areas susceptible to freeze/thaw cycles, etc. If dampness/high humidity is a possible cause, a hygrometer should be used to measure relative humidity.

B. Bulk/Surface Sampling

Bulk or surface sampling is not always necessary, and should not be done indiscriminately. It should only be undertaken when the IH/IEP has a hypothesis or theory that sampling results will help him/her answer. Such sampling is seldom needed for relatively small jobs such as those in homes and other residential settings. If samples are collected, it is important that the right kind of sample is collected and analyzed with the appropriate method that will yield meaningful results. Therefore, be sure to follow these caveats:

- Do not collect samples if you don't know what how to interpret the results.
- Do not collect samples if the results will not add any useful information.
- If you do collect samples, always call an AIHA EMLAP accredited lab first to discuss the type of information that you hope to gain, and check to make sure that the particular sampling method you are planning to use will give you what you are looking for.
- Do not sample if the results will not affect your remediation plan.

For more information about testing, refer to the Arkansas Department of Health Mold Information Sheet.

C. Air Monitoring

1. The same caveats mentioned above for bulk and surface samples apply to collecting air samples for fungi. Samples should not be collected indiscriminately, but only by a Certified Inspector to support or refute a hypothesis. Such sampling is seldom needed in homes or other residential settings. Professional judgment based upon experience and training should guide the Certified Inspector who uses air sampling judiciously as a tool. Communication with an AIHA EMLAP certified laboratory is highly recommended *before* samples are collected. This is to ensure that the proper collection and analytical methods will be used on a particular job to yield meaningful results for the project.

2. There are no standards for comparison with any air samples collected for microbial agents. Data must be evaluated by a Certified Individual within the context of the entire investigation. Decisions about whether to clean/remediate are almost never made based solely upon air monitoring data.
3. Air monitoring may be useful if the presence of mold is suspected (e.g., musty odors) but cannot be identified by visual inspection due to hidden mold, or colorless or light colored fungi which may not be visible to the naked eye, or bulk sampling (i.e., bulk sampling for hidden mold). The purpose of such air monitoring is to aid in determining the location and/or extent of contamination.
4. Air monitoring may be necessary if there is evidence from a visual inspection or bulk sampling that those ventilation systems have been 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.
5. If air monitoring is performed, for comparative purposes, outdoor air samples should be collected concurrently at a building supply 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' book, Bioaerosols: Assessment and Control.
6. Post-remediation sampling results are almost never zero. This is because mold is everywhere. Even after a thorough cleaning, some mold normally found outdoors will likely migrate into the area as soon as the remediation is complete.

D. Analysis of Environmental Samples

The Mold Investigation Advisory Board recommends the use of laboratories accredited by the American Industrial Hygiene Association's Environmental Microbiology Laboratory Accreditation Program (EMLAP) to analyze viable and non-viable air samples and bulk/surface samples for bacteria and fungi in indoor environments. Participation in EMLAP ensures that the lab uses documented quality controlled procedures, and participates in quarterly proficiency testing.

There are some specialty procedures that the Certified Individual may choose, because he/she feels that they may add information that they cannot obtain from culturable or spore trap

sampling, or bulk or swab sampling. Some of these specialty procedures include QPCR (quantitative polymerase chain reaction), ergosterol as a measure of fungal biomass (for large-scale buildings and research projects) and endotoxin (for gram negative bacteria, which may also be present during floods). Laboratories with a great deal of experience should be used to perform these analytical procedures. They are often university, government, or research laboratories. Certified Individuals desiring to include some of these specialty procedures as part of their sampling plan on mold abatement jobs are encouraged to call Arkansas Department of Health (ADH) at 501-661-2833 *prior to the start of the job* for additional information and guidance.

VI. REMEDIATION

The goal of mold remediation is to remove or clean mold-damaged materials using work practices that protect occupants by controlling the dispersion of mold from the work area and protect remediation workers from exposures to molds. The generalized remediation procedures should result in:

- Elimination of visible mold
- Reduction of hidden mold
- Restoration of the microbial composition to that normally found in ambient outdoor and non-affected indoor areas

A. Factors to Consider When Planning Mold Abatement

Indoor mold problems arise from water problems. *Knowing whether the water problems are chronic, or a one-time occurrence helps inform how the remediation project will be designed and executed.*

An interdisciplinary approach is often required in order to perform mold abatement. For example, Heating, Ventilation, and Air-Conditioning (HVAC) engineers, hospital infection control practitioners, and facilities engineers may all be a part of the remediation planning team, depending upon the setting.

Note that other types of abatement work (i.e., lead and asbestos abatement) often include water sprays and/or misting for dust control. However, on mold abatement projects, an important goal is to dry out the environment to prevent mold from propagating. Professional judgment must be used based upon training and experience when deciding upon the best

method(s) for dust control on a mold abatement job, but consideration should be given to HEPA (high efficiency particulate air) vacuuming in place of, or in conjunction with the judicious use of light misting to suppress dust in the work area. Refer to the most recent edition of *IICRC S520* for further information.

B. Determining Scope of Work

The most common method for determining the scope and safety precautions to be used in a mold abatement project is to estimate the size of the contaminated area by visual inspection. This method is used in both the NYC and EPA Guidelines. The “size of contamination” concept has gained popular acceptance because it is easy to understand and communicate, and is workable if the water damage is stopped and handled right away, within the first two days. However, if the water is not stopped and the property is not dried out thoroughly within 48 hours, mold will grow, and can infest porous surfaces. The problem with the “size alone” concept is several fold:

- It does not take into account the possible presence of hidden mold. If the water caused a significant amount of damage, and the area remained wet/damp for more than 48 hours, there is a good likelihood that mold is growing in both places that are visible and behind/inside visible areas (such as wall cavities, attics, crawl spaces, etc.).
- The “size alone” concept does not take into account special populations/settings such as hospitals, nursing homes, rehabilitation facilities, same-day surgery centers or other medical treatment facilities, or private residences where a chronically debilitated patient lives.

Rather than relying upon “size of contamination” for project planning, the IICRC S520 [voluntary] *Standard and Reference Guide for Professional Mold Remediation* uses the terms *Conditions 1, 2 and 3* to define indoor environments relative to mold. A table comparing/contrasting this approach with the size of contamination approach described in the NYC Guidelines is presented below.

IICRC S520	NYC Guidelines <i>(Note that the NYC Guides refers to active</i>
<u>Condition 1 (normal fungal ecology):</u> An indoor environment that may have settled spores, fungal fragments or traces of actual growth whose identity, location and quantity are reflective of normal fungal ecology for a similar indoor environment	N/A
<u>Condition 2 (settled spores):</u> An indoor environment that is primarily contaminated with settled spores that were dispersed directly or indirectly from a Condition 3 area, and which may have traces of actual growth	N/A
<u>Condition 3 (actual growth):</u> An indoor environment that is primarily contaminated with the presence of actual mold growth and associated spores. Actual growth includes growth that is active or dormant, visible or hidden.	<u>Level I: Small Isolated Areas</u> (10 sq. ft or less) - e.g., ceiling tiles, small areas on walls <u>Level II: Mid-Sized Isolated Areas</u> (10 - 30 sq. ft.) - e.g., individual wallboard panels. <u>Level III: Large Isolated Areas</u> (30 - 100 square feet) - e.g., several wallboard panels. <u>Level IV: Extensive Contamination</u> (greater than 100 contiguous square feet in an area)
<u>Section 11 of S520</u> (December 2003 version): HVAC Remediation	<u>Level V: Remediation of HVAC Systems</u>
<u>Section 12 of S520</u> (December 2003 version): Contents Remediation	<u>Contents Remediation – not covered</u>

The Mold Investigation Advisory Board recommends that for general purposes, mold abatement contractors employ the IICRC S520 method to describe the scope of their remediation project. It may be desirable to use the “size of contamination” approach as ascribed to in the NYC and EPA guidelines to help decide upon the initial type of containment to be used (i.e., source containment, local [mini], or full scale containment). Be prepared to expand the type of containment used if additional contamination or hidden mold is found.

Although the majority of technical procedures and practices are covered in IICRC S520 that Mold Investigation Advisory Board recommends mold abatement contractors follow, there are several specifics in S520 that warrant special attention:

- When performing structural remediation, the contaminated area must be isolated from non-contaminant areas to prevent cross-contamination. This usually involves building a barrier or containment structure, usually made with polyethylene sheeting. The containment structure should be checked to make sure that it does not leak, is strong enough to withstand the number of negative air machines that will be placed inside, and if pressure differentials are lost, containment flaps will close so that contaminated materials remain inside of the structure. Experience and training will help guide the contractor regarding size and construction of containment, *but be prepared to expand the containment structure when additional mold is found (i.e., hidden mold), and the scope of the project is expanded.*
- If abrasive tools are to be used, the abatement contractor should establish HEPA filtered negative air in the workspace. This limits the potential spread of contamination
- Physically removing mold contamination is the primary means of remediation. This statement means that it is not acceptable to simply spray a product over mold to cover it up. Indiscriminant use of antimicrobial products, coatings, sealants, and cleaning chemicals is also not recommended. They may be used as complimentary tools on certain surfaces *after the mold has been removed.*
- Mold resistant coatings/sealants should not be sprayed on top of actively growing mold.
- Fungicidal coatings (those rated to kill mold) should not be used as sealants or encapsulants on active, viable mold.
- The use of antimicrobial agents in the form of fogging agents is not recommended for mold remediation in buildings. These are gas or vapor- phase antimicrobials that, by the nature of the delivery system, do not offer enough concentration and contact time to be effective at killing mold. Other problems include toxicity, inefficient capture rate, and the fact that physical removal is still necessary after fogging.
- Biocides are useful in treating indoor environments flooded with raw sewage.
- In all usage situations the product label is not only the law but the technical guide for application, efficacy for the situation and proper handling.

C. Guidelines for dealing with specific water-damaged materials

- **Ceiling tiles:** Items should be discarded and replaced.

- **Carpet and backing:** All furniture/cabinets sitting on wet carpet should be removed. Water should be removed with an extraction vacuum; ambient humidity levels should be reduced with dehumidifiers; and drying should be accelerated by using fans.
- **Cellulose insulation:** Material should be discarded and replaced.
- **Fiberglass insulation:** Material should be discarded and replaced.
- **Electrical:** Consider all wet wiring, light fixtures and electrical outlets to be shock hazards. Power should be turned off in the affected areas until these hazards have been checked by a building inspector or an electrician. All wet electrical components need to be replaced. All wet electrical motors, light fixtures and similar items must be opened, cleaned, and air-dried by a qualified technician and visually inspected for moisture before they are placed back into service.
- **Books and papers:** Non-valuable materials should be discarded. Valuable/important items should be photocopied and the originals discarded. For items with high monetary or sentimental value, a restoration/water damage specialist should be consulted.
- **Concrete or cinder block surfaces:** Water should be removed with a water extraction vacuum and drying should be accelerated with dehumidifiers, fans and/or heaters.
- **Flooring (linoleum, ceramic tile and vinyl):** Material should be vacuumed or damp wiped with water and mild detergent and allowed to dry.
- **Non-porous, hard surfaces (plastics, metals):** Surfaces should be vacuumed and damp wiped with water and mild detergent.
- **Upholstered furniture:** Water should be removed with an extraction vacuum. Drying should be accelerated with dehumidifiers, fans and/or heaters. Drying furniture may be difficult to complete in 48 hours. If the furniture is valuable, consult a restoration/water damage specialist.
- **Wallboard (drywall and gypsum board):** May be dried in place if there is no water stain or obvious swelling and the seams are intact. Remove base molding to inspect the wallboard.
- **Wood surfaces:** Remove moisture immediately and use dehumidifiers, gentle heat and fans for drying. Use caution when applying heat to hardwood floors. Treated or finished wood surfaces may be cleaned with mild detergent and clean water and allowed to dry. Wet paneling should be pried away from the wall for drying.

VII. REMEDIATION OF HEATING, VENTILATION, AND AIR-CONDITIONING (HVAC) SYSTEMS

IICRC S520, Section 11 is devoted to the remediation of HVAC systems. This section refers to the National Air Duct Cleaners Association's (NADCA) document, *ACR 2006: Assessment, Cleaning, and Restoration of HVAC Systems*. This document has become an industry standard. AR DPH recommends that mold abatement contractors engaged in remediation of HVAC systems follow

S520 section 11 (or appropriately re-numbered section in future revisions) document thoroughly, and refer to NADCA ACR 2006 for further technical information.

As mentioned above, the majority of technical procedures and practices are covered in the IICRC S520 that Mold Investigation Advisory Board recommends mold abatement contractors follow. However, there are a few key points in S520 that warrant special attention. NOTE: flexible HVAC ducts are not easily cleaned and removal must remain as the primary remediation technique unless effective cleaning can be documented.

- Isolating HVAC components from other parts of the building that are undergoing abatement is recommended.
- Use of biocides in HVAC systems is discouraged. If there is a fungal infestation inside of ducts or other HVAC components, *the mold must be physically removed*. It is not appropriate to spray antimicrobial products, coatings, sealants or encapsulants on top of viable or non-viable mold in HVAC systems.
- Use of coatings & sealants prophylactically, (during new installation or new construction) or as a final treatment post-remediation as a lockdown for residual particulate & to provide a smooth, clean surface to deter future fungal activity may be of some value.

VIII. HEALTH AND SAFETY, HAZARD COMMUNICATION

S520 refers to pertinent OSHA Standards for occupational health concerns, including the OSHA General Duty Clause, Emergency Action And Fire Protection Plans, Personal Protective Equipment, Respiratory Protection, Asbestos, Lead, Heat Disorders And Health Effects, Confined Spaces, Hazard Communication, Lockout/Tagout, Fall Protection, Noise Protection, And Scaffolds. All of the OSHA standards should be followed during any remediation work.

Contractors that get involved in mold abatement are likely to encounter asbestos and lead on the job at some point. The ADH regulates lead-based paint abatement (www.arkansas.health.gov) and the Arkansas Department of Environmental Quality (ADEQ) regulates asbestos abatement (www.adeg.state.ar.us). Mold abatement contractors must follow all state regulations pertaining to asbestos and lead. To obtain further information, contacts for each program at the websites listed.

IX. CONCLUSIONS

The Arkansas Mold Investigation Advisory Board recognizes the fine work of other guidelines that precede the *Arkansas Guidelines for Mold Abatement Contractors*. Much of the technical information and recommendations contained in this document is consistent with or nearly identical to those made by agencies and departments in other states such as New York, California and Colorado. Wherever applicable, lessons learned and best practices from other jurisdictions have been incorporated into this guidance. We refer readers to the IIRCR S520 and NYC *Guidelines on Assessment and Remediation of Fungi in Indoor Environments* for detailed technical recommendations for most of the technical and procedural specifications needed to perform mold abatement work in a manner that protects building occupants, the abatement workers themselves, and the building structure. We remind readers to keep in mind the basic tenets of mold in indoor environments and conclude by reminding readers that the *Arkansas Guidelines for Mold Abatement Contractors* are not to be deemed as regulations.

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