SOLUTIONS - Indoor Environmental Consulting
Presents

Indiana IAQ

July/August 2011 Issue

About Indiana IAQ:

This is *the* newsletter for those interested in Indoor Air Quality (IAQ). This newsletter is developed from the many questions and concerns received from its readers. Information is collected and applied this way to the articles published.

Who can write in? *Anyone!* Contractors, mitigation technicians, restoration and remediation technicians, real estate professionals, banks, doctors, lawyers, insurance professionals, investors, *anyone* with an interest in IAQ.

To submit an idea for an article, write to: IndianaIAQ@solutionsiec.com.

Inside this issue:

MEMBER OF Indoor Air Quality ASSOCIATION INC.

Inside This Issue of Indiana IAQ

In our September/October 2010 edition of Indiana IAQ we answered two questions brought to us:

"Should I be concerned with having an indoor environmentalist on my fire restoration process?" and, "How do I know who is qualified to do fire damage restoration and who isn't?" Both very good questions.

Since we released that edition of Indiana IAQ we have had several questions come in from home owners and restoration contractors regarding some of the dynamics of fires, how that plays a role in the spread of soot during and after a fire, as well as what kind of standards or regulations apply to insurance and restoration professionals. In this issue of Indiana IAQ we will touch on some of these questions.

While we will not be able to give you specific advice for every situation, hopefully this information will be enough to help you get started handing your fire-damaged structure, protect your safety and health, and begin to feel more confident moving forward. Keep in mind the information that we already shared (and we'll try not to repeat here) in past editions of Indiana IAQ and that we, here at SOLUTIONS, are always here for you.

We welcome any of your comments and questions. You can contact the newsletter at IndianaIAQ@solutionsiec.com or me directly at jasony@solutionsiec.com. You can also contact our office for a no-obligation review of your claim by calling (877) 624-7185 extension 2.

Have a blessed day!

— Jason Yost

An Insight into Fire-damage Assessment & Restoration:

When a fire occurs the by-products can travel great distances. As you can see from this picture, the by-products of a fire are on the move: From a localized fire over the stove, smoke and other particulates can be transported throughout the structure; and, from adjacent burning structures or systems, …
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throughout the housing structure and outside—where it can affect systems and structures in the community. What causes this transportation of debris? What kind of debris is present? How long is this debris present and dangerous? These and other questions we will try to address in this article.

During a fire damage heat, smoke, and the depletion of oxygen interact, exerting themselves as serious hazards. Smoke consists of: particles, various free radicals, gases and chemicals, and much more. In a recent study, soot, alone, was found to include other contaminants such as: ammonia, carbon monoxide, carbon dioxide, hydrogen cyanide, nitrogen oxides, hydrogen chloride, sulfur dioxide, isocyanates, and acrolein. A lot to consider besides just the particulate matter; especially since many of these chemicals and gases are stored inside the soot for a long time after the fire is extinguished — meaning, these things can be carried into your lungs (and in some cases into the blood stream) by the soot as it enters your body through respiration.

Something else to consider is water and its contributing affect on the indoor environmental quality. Water is not just a product of the extinguishing process(es) but is a natural product of combustion. During a fire water droplets can serve as a vehicle of transport for absorbed acids, such as hydrochloric acid, making it a contributor toward smoke-inhalation injuries. Additionally, residual moisture, left behind during the fire-extinguishing processes, can contribute toward the development of microbes, such as mold and bacteria, when not processed quickly and adequately enough. This secondary damage is especially true when ventilation is inadequate or non-existent after a fire.

Without adequate ventilation water molecules can become very stagnant. This accumulation of moisture, into a micro-environment, allows the moisture to become available to the microorganisms (available in the sense that nothing is moving them quickly enough to keep the microorganisms from absorbing and using the moisture). This can contribute to microbial (bacteria, mold and others) infestations on building components, in building systems and/or various content items (clothing, furniture, and food).

So, as you can see, there is a complex mixture of surface and airborne debris present in a fire-damaged structure. The extent to which these things contaminate the building and threaten occupants' health and safety are dependant on:

- How much of the building is actually contaminated?
- How sensitized is each individual occupant to the (1) amount of contamination taken in during a given period of ingestion/respiration and (2) how long will they be exposed to that amount (dose) of contamination?

These are serious things to consider. A fire damage is more than a visual inspection for soot, where ever the source and whatever the situation, understanding the physical effects of a fire on a localized building and its components should be part of the investigation process. But before we get into that, let's briefly discuss, a little further, some of the dynamics involved in the initial processes that lead to the spread of contamination during and after a fire.

Let's look at a recent claim that I was called out to — one where the home owner and insurance company were trying to determine if there was soot in the wall cavities and, if so, find an explanation for its being there. Upon review of this structure, we did find soot in the wall cavities, but how did it get there? The same dynamics involved in this soot getting into these wall cavities are the same ones that cause the other by-products of a fire to travel from source to other areas.

During a fire various forms of pressure are created. One of the greatest of these is heat, which causes a lot of debris, such as gases, fumes and particle matter, to rise through the structure. This rising debris will follow the path of least resistance, such as plumbing and electrical accesses, until either/and (1) the environment changes, allowing it to settle into a state of equilibrium (even if that equilibrium is un-natural to the indoor environment's normal condition) and (2) micro-environments of absorbent materials (like clothing, furniture and drywall) receive the airborne debris and keep it.

What should be noted here is that both of these conditions are temporary; for example, the heat generated, that exerts its force (pressure) on the indoor environment, depreciates as the fire is extinguished and as time elapses thereafter. During this transition the indoor environment will go through some dramatic changes; one of a very hot and unstable condition to one of a cold and stagnant one (especially where there is no ventilation). As these changes take place the pressure(s) that forced this debris upward depreciate and reverse, allowing airborne debris (including moisture and soot) to settle downward, via gravity and vapor pressure to name just two. During this period of adjustment one would expect airborne debris to settle at a rate equal to its weight in relation to the pressures exerted upon it (gravity and vapor pressure, for example).

In this particular home plumbing, electrical and ductwork access holes in the floor of the basement were cut much larger than needed, creating large openings between the basement's ambient air (where the fire took place) and the wall cavities themselves. To further complicate this matter, some of these runs of electrical wiring ran all the way up to the attic before being run back down the walls (into the second floor's light switch and socket boxes) — and the access holes for this wiring (running from the attic downward) was equally oversized. All of these allowed free and unhindered access to wall cavities for debris to travel.

When I showed my client the pictures of this damage he asked me , "What kind of health effects should I be concerned about?" A good question and one you are probably asking yourself. Well, According to the U.S. Environmental Protection Agency (EPA) . . . (continued on page 3)

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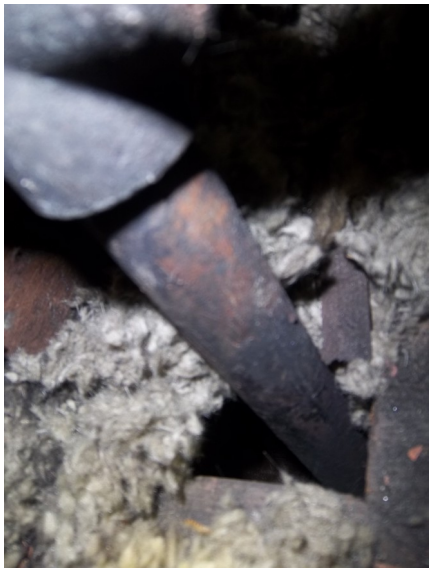
the health consequences vary with the size, mass, concentration and other contaminants which interact with one another. But this really isn't a reasonable end to the question is it?

According to the Commission on Life Sciences (CLS) these hazards can be categorized into three categories: (1) immediate or in-fire, (2) early post-exposure effects, and (3) long-term sequelae.



Picture of the oversized access hole. Notice the amount of soot around this hole.

Long-term exposure hazards can be a result of a single or continuous exposure to the contaminants present during, immediately after, or long after the fire has been extinguished. The CLS lists things like chronic obstructive pulmonary disease and cancer as two examples of diseases associated with this form of exposure to soot.

In addition to these hazards, associated with exposure to soot, secondary-damage can lead to microbial infestation of the structure which can be categorized as:

allergic

irritatant

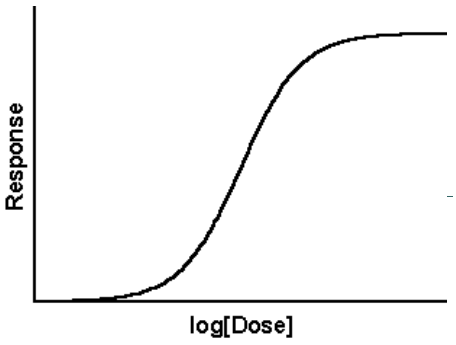
infectious

toxic

General dose/response relations as it pertains to exposure routes and occupant sensitivities determine if and how one might respond to these types of infestations. Consider that there are over 100,000 identified mold species and many others that have yet been identified. Of these molds occupants of a building may have various responses to varying concentrations; that is, one person may have an ill-response to a certain dose while another may require a larger dose before sensing a response.

Soot inside the wall cavity.

Where one falls on the dose/response curve depends largely on their personal sensitivity to the specific species of mold they are ingesting, inhaling or absorbing.



(For more information on the health effects associated with mold see our November 2009 edition of Indiana IAQ on our website www.solutionsiec.com.)

For those of you reading this who have experienced a fire damage you are probably wondering the same things that many of my clients do:

Who assessed these things when I had my fire damage?

Were they taken care of or covered up?

Who does these kinds of assessments and repairs?

How do I know things are (or will be) safe for me and my family or employees?

The current state of the fire restoration industry is such that there are no regulations for the professional restoration of a structure. What happens, as a result, is that many contractors and insurance professionals go by (1) what they can smell or (2) what they can pick up (in the form of soot) on a surface to determine what needs to be cleaned and (3) if that surface can be cleaned or not. What happens, when this form of assessment is performed, is (1) the entire building and its systems are not properly assessed and (2) the indoor environmental quality is overlooked.

For those of you in the restoration and insurance industries, I would point out that, while there are no governmental regulations for fire damage restoration, there are industry guidelines. Here are two:

IESO—RIA 6000/Standards for Fire Restoration

IESO-RIA 6001/Evaluation of HVAC/Mechanical System Surfaces to Determine the Impact from Fire Related Particulate

The Restoration Industry Association provides training in these standards.

What these standards do not address are the proper ways to assess the built environment as it pertains to those things we have discussed in this article. This is where a properly trained Council-certified Indoor Environmental Consultant or Certified Industrial Hygienist should be involved on claims . . .

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SOLUTIONS
Indoor Environmental Consulting

"Don't let problems with poor indoor environmental quality take control of your life. Empower yourself with SOLUTONS—Indoor Environmental Consulting—today!"

(877) 624-7185

We're on the web!

www.SolutionsIEC.com

And

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SOLUTIONS IEC is a truly experienced business that, with over nineteen years of mitigation, restoration, remediation and hygiene practices, can assist you in determining the Category and Condition of the damaged structure; develop a protocol that is real and specific to the structure; and can provide expertise beyond just an inspector's role. Our staff of professionals have been recognized in a number of professional specialties such as indoor environmental consulting (Council-certified Indoor Environmental Consultants) and microbial remediation supervision (Council-certified Microbial Remediation Supervisors) - two of the most prestigious awards in the industry today! Don't let poor IEQ take control of your life. Empower yourself with SOLUTIONS—Indoor Environmental Consulting—toady!

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because these professionals are trained in the standards, guidelines and regulations applicable to assess structures exposed to fire and smoke damage.

What standards, guidelines and regulations exist for these professionals that differ from the restorers? There are many, but here are a few:

- NIOSH 5000—Carbon Black (which discusses sampling protocols and analytical analyses practices and interpretations)
- EPA's Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air; TO-15
- Some States have regulations for how much of a contaminant can be found in the ambient air. Indiana has some, like Polycyclic Aromatic Hydrocarbons (PAHs) found in the ambient air not to exceed an 8-hour average concentration of 0.100 µg/m3

Point is: *It is important that qualified professionals assess, restore and qualify restoration according to these standards and those that may be applicable to your health and safety as per your doctor's medical surveillance.* This not only protects you from incomplete restoration, but protects you, your family, your co-workers, your employees and all other materially interested parties from potential safety and health threats.

For questions give us a call. We provide a no-obligation review of your case. Phones are open Monday through Friday 8 a.m. through 7 p.m. (Eastern Standard Time, EST) and Saturday 9 a.m. through 5 p.m. You can also submit an IAQ Questionnaire from our website (www.solutionsiec.com) and a client service professional will review it and contact you back promptly.

Don't take chances — gain SOLUTIONS!

While we have covered a lot of information, we have only brushed the surface. As always, SOLUTIONS welcomes your comments and questions. Please write to us at IndianaIAQ@solutionsiec.com about this article or others or with questions and ideas for future articles.

Have a blessed day!

Author: Jason Yost, CIEC, CMRS, CSDS, and CIES, is owner of SOLUTIONS IEC, and has been in the cleaning, restoration, remediation, mitigation, and IAQ industry for over nineteen years. Jason is a member of the Indoor Air Quality Association and a board member of the American Council for Accredited Certification (ACAC). To learn more about Jason visit our website at www.solutionsiec.com or to learn more about Jason's credentials visit the ACAC's website at www.acac.org. To discuss a training need for your company contact Jason directly at jasony@solutionsiec.com or (877) 624-7185 extension 2.