



IAQ RADIO+

Show Number: 744 BLOG

**Joe Spurgeon, PhD**

**A Perspective on the AIHA White Paper  
Mold and Dampness in the Built Environment**

Good day and welcome to IAQ Radio+ episode 744 blog. This week we welcomed back Dr. Joe Spurgeon to provide his perspective on the AIHA White Paper, Mold and Dampness in the Built Environment. We could not think of a better way to end the year than doing a wrap up show with Dr. Spurgeon. He is one of our most popular guests.

**Joe Spurgeon, PHD**, has a multidisciplinary doctorate degree in Analytical Chemistry and Environmental Health from the University of Pittsburgh; and was a Certified Industrial Hygienist from 1993 – 2013. His career has included working as a research chemist on the NBS Lead-Paint Poisoning Program, directing the FAA's Combustion Toxicology Laboratory, performing Health Assessments for CDC/ATSDR, implementing US EPA's Laboratory Exposure Assessment Project, and working as a consultant specializing in microbial indoor air quality for US PHS. He has performed numerous residential and commercial investigations involving water intrusions and microbial contaminants; has taught courses on mold investigations, sampling, and data interpretation methods; and has served as an expert witness in numerous mold cases. His books are available at <http://expertonmold.com/> where you can also download archived articles and presentations.

**Nuggets mined from today's episode:**

Joe's general observations about the AIHA White Paper "Mold and Dampness in the Built Environment are:

- It's a good white paper.
- The paper is consistent with many years of thought.
- The paper is a synopsis of the current state of the IAQ industry.
- And, Joe offered several suggestions for improving sampling methods and provided supporting documentation to support his recommendations.

- Joe questioned the continued support for what are generally agreed to be unreliable methods within the IAQ community and lack of emphasis on improvements in methodology over the years.
- He quoted an adage: “The perfect is the enemy of the good”. Maybe we can’t make our methods perfect, but we can improve them.
- The limitations of current methods are not taught, the need for improved methods is not emphasized, and the adoption of improved methods is often limited by fear of liability.

## SELECTED MATERIAL FROM JOE’S PRESENTATION

**JOE’s 4 Postulates – Basis for his logic and reasoning, Provides you with an insight into his positions and biases.**

1. A numerical lab report cannot be interpreted without using numerical guidelines. A “coordinate system” is required. “Professional judgement” is just a set of implicit rather than explicit numerical guidelines
2. Inspection Objective: Mold is always present in indoor spaces Not looking for Mold during an inspection. Looking for the AMPLIFICATION of mold. The *excessive growth* of mold in the indoor environment. We need methods that can differentiate between “normal” and “amplified” conditions. He prefers that professional judgement be based on explicit rather than implicit guidelines and decision criteria
3. The common mold sampling methods and data interpretation methods have significant issues that limit their utility for assessing Building-related Contamination, Occupant Exposure Potentials, and Mold-related Health Risk. **AND** a substantial improvement in assessments of condition could be achieved if current methods were modified to increase their usefulness and reliability (“SOCS” criteria)
4. Sampling and interpretation methods should satisfy the “SOCS” criteria  
Reliable methods MUST satisfy at least these criteria:
  - Significance of the sample result  
Reference system, method for assessing results as Low – High  
The method measures what you think it is measuring
  - Objective guidelines and decision criteria  
State the guidelines for interpretation before sampling
  - Consistent application between projects & inspectors  
If Conditions similar to “A”, then Assessment similar to “A”

- Stable basis for comparing sample results independent of Weather, Geography, etc.
- There is little association between Indoor and Outdoor Air Samples (cites McKintosh). **Indoor-Outdoor comparisons often measure the variability of the outdoor air, not the condition of the indoor space**
- AIHA White Paper “Results only represent conditions at the time of the inspection and cannot be compared to other data or averages.” Joe Spurgeon- *Applies to Single Samples but does not apply to a Distribution of Concentrations*
- Joe is an advocate of QPCR analysis of samples when fungal species are a concern
- **The White Paper Emphasizes assessing Mold-related Health Risk but discounts the need to assess** Building Related Contamination (BRC) and Occupant Exposure Potential (OEP). Joe opines BRC and OEP are 2 different inspection objectives. BRC can be measured with current methods. OEP is limited by current methods, but more reliable methods are available.
- Joe agreed with the statement - “Sampling should only be performed if the results provide an answer to a question or hypothesis.” The White Paper states – “Since current methods do not provide information on health risks associated with mold exposures, health assessment is primarily based on the extent of water or moisture damage and mold growth”. Joe opines- Exposure to nonvisible mold should be a concern. Joe recommends sampling air supply grills, hard surfaces, carpet dust, air return filters and comparing the results using fungal species.
- The White Paper says- Microbial measurements are not currently useful for estimating dampness or mold-related health risks. Joe opines- *What about their utility for estimating BRC or OEP?*
- Joe opines- When you don’t sample you risk missing about a third of problem houses!
- **IMPORTANTANCE OF UNDERSTANDING Laboratory “Standard Operating Procedure” (SOP)**  
Results reported on a Weight-Analyzed Basis  
Use a 300 um sieve to remove large debris  
Analyze a 5-milligram portion of the “fines”

Without weighing the sample of dust!!

Divide the result by 5 mg

Report "Mold per mg" of dust [*analyzed*]

BUT the number of mg in the sample is not reported unless that is requested  
*So, the fungal loading in the sample is unknown!!*

Joe points out the SOP of most labs analyzing a surface bulk sample of dust remove a small quantity of the bulk sample (e.g. 5 milligrams) and reports the results to the total weight of the bulk material. Joe demonstrated the significant difference in results reported on a weight- and area-basis and recommended the lab be requested to provide the total weight of the bulk sample.

How to improve your assessments

- Measure the area sampled
  - Ask the lab to report the total sample weight
  - Assess sample results on an Area Basis
- White paper says- "Since current methods do not provide information on health risks associated with mold exposures, health assessment is primarily based on the extent of water or moisture damage and (Joe added *visible*) mold growth". Joe agreed that "Microbial measurements are not currently useful for estimating dampness or mold-related health risks". But *Joe opines- But are they useful for assessing BRC or OEP?*
  - White Paper Says- "There are no recognized or accepted quantitative, health-based microbial exposure guidelines or thresholds based on existing methods for air or dust samples."
  - Joe opines - "If we continue to use current methods, we will never be able to associate mold concentrations with health effects" Continuing to use current methods is the definition of insanity "doing something repeatedly and expecting a different outcome". Joe queries-Why not use better methods? *Even when a method isn't perfect, if it improves the ability to assess BRC and OEP why not use it? Professional organizations are not familiar with and do not emphasize the need to develop new methods. Mold Inspector reluctance to embrace new methods Fear of legal liability and "No one else uses this method".*
  - Joe opines- N6 samplers are prone to saturation when high levels of mold are present resulting in flawed underestimation of mold levels present, and should not be used to determine occupant exposure. Joe recommends that

filter cassettes be used for assessing occupant exposure. (OSHA Method 14 recommends filter cassettes).

- Sample Collection & Interpretation

White Paper Says- "Sampling data must be comprehensive and communicated in a form useful to physicians, other mold professionals, occupants, and decision-makers"

"Samples should not be collected without a clear purpose (hypothesis testing) that has been determined ahead of time"

"A sufficient number of samples must be collected to reliably assess the existing conditions"

Joe queries, *when can we collect those samples, and what do we do with them?*

- Fungal Loading in 59 Carpet Samples Stratified by Condition

Controls                      Group 1  $\approx$  120 cfu/100 cm<sup>2</sup>

Potentially Damaged      Group 2  $\approx$  1,300 cfu/100 cm<sup>2</sup>

Water Damaged              Group 3  $\approx$  9,000 cfu/100 cm<sup>2</sup>

Decision criteria corresponds to IICRC S-520, Conditions 1, 2, & 3

- Mycotoxins (White Paper)

None of the agriculturally important mycotoxins (aflatoxin, fumonisin, deoxynivalenol [DON], zearalenone, ochratoxin) are produced by fungi that grow on water damaged building materials

There are validated tests for mycotoxins in animals but not for human serum or urine samples

There are no reference ranges for mycotoxins in humans

Joe opines - Lab reports often include agricultural mycotoxins, and some lab results are not standardized for comparison as ACGIH Biological Exposure Indices (BEI's) are for toxins in biological fluids

Joe says- There are no ACGIH BEI's for mycotoxins.

## THE MOLD REPORT

### White Paper

- At a minimum, reports should include
  - A statement of purpose and limitations
  - Observations, results, conclusions
  - Recommendations

- Speculation or medical causation should not be included in the report
- The mold report must provide information that can:
  - Be translated into an action plan for remediation
  - Provide a basis for protecting the health of occupants and remediation workers
    - *Joe asks - Requirement consistent with guidance that sampling is optional?*
  - Be useful for the intended audience
- Investigators should provide clear and consistent field notes with sufficient detail and documentation to allow the fieldwork and sampling data to be interpreted, verified, and repeated. Photos only of meter readings are insufficient

#### Joe's Comments

- Document Samples and Information Using Field Sheets (template for Field Sheet download form [www.expertonmold.com](http://www.expertonmold.com))  
Information includes – Sample Location, Surface Sampled, Sampling Parameters, and Conditions-why sample was collected.

- DATA TABLES FOR INTERPRETING SAMPLE RESULTS  
Data in rank order for dominant contaminant spores  
Percentages and/or ratios included in the Table  
IICRC Conditional Areas assigned for use by Remediation Contractor

- A QUALITY ASSESSMENT REPORT

*A report that converts reliable data into usable, actionable information*

- By:
  - Using and applying reliable principles and methods
  - Documenting the inspection using field sheets
  - Assessing and interpreting the results using data tables
  - Associating conclusions with specific results and supporting recommendations with specific conclusions
- Communicating that information clearly & effectively using the least technical language possible

## **SUMMARY OF AIHA POSITIONS (WHITE PAPER-Mold and Dampness in the Built Environment)**

- Investigation must be based on an informed visual and olfactory assessment that may be augmented by the judicious use of existing sampling methods
- Observable indicators of dampness and mold are the best surrogates for determining if a problem exists
- Estimates of the extent of visible mold or dampness are the best predictors of short- and long-term health outcomes
  - *Joe - But what about as predictors of BRC or OEP?*
- Since current methods do not provide information on health risks associated with mold exposures, health assessment is primarily based on the extent of water or moisture damage and mold growth
  - Microbial measurements are not currently useful for estimating dampness or mold-related health risks
  - *Joe - But are they useful for assessing BRC or OEP?*

## SUMMARY OF JOE SPURGEON'S POSITIONS

- A contaminant assessment consists of three parts
  - 1. An Exposure Assessment
    - Is the contaminant present?
      - 32% of problem houses missed without sampling
  - 2. A Risk Assessment
    - Is the concentration sufficiently elevated to be of concern?
      - “Contaminant” vs “Contaminant of Concern”
        - » *As defined by CDC/ATSDR for Health Risk Assessments*
    - Qualitative parameters alone result in false negatives
      - Example of air supply ducts
  - 3. Risk Management: Restoration or remediation
- The White Paper emphasized
- A reliance on qualitative methods (dampness, odors, etc.)
- The limitations of current sampling methods for assessing Mold-related Health Risk
- 1. Minimized consideration of the practical necessity for assessing Building-related Contamination and Occupant Exposure Potential
- 2. I question whether qualitative methods by themselves are any more reliable for assessing condition than current sampling methods

## WHY NOT USE A BETTER METHOD

- “If we continue to use current methods, we will never be able to associate mold concentrations with health effects”
- *Even if a method isn't perfect, if it improves the ability to assess BRC and OEP why not use it?*
  - *Professional organizations*
    - *Are not familiar with and do not support methods development*
  - *Mold Inspectors*
    - *Fear of legal liability*
    - *“No one else uses this method”*

*Joe – In general agreement with the White Paper. However, what is needed most is an open discussion of method and procedural limitations, the need for improved methods within the IAQ community, and support for the development of improved methods and procedures. This pre-supposes the acknowledgment that reliable sampling is more than optional.*

## **Z-MAN SIGNING OFF**

TRIVIA:

What is the maximum number of Friday the 13ths that can occur in a calendar year?

Answer: 3

Answered by: