Critique of Ralph Moon/GHD EXEMPLARS Used To Deny Coverage

4-20-22

NAERMC
National Association of Environmentally Responsible Mold Contractors

Dr. Gary Rosen President of NAERMC

Florida Department of Business & Professional Regulation

Division of Professions
Mold Related Services
1940 North Monroe Street
Tallahassee, Florida 32399-2214
Phone: 850.717.1984 • Fax: 850.922.2918

Ken Lawson, Secretary

Rick Scott, Governor

February 26, 2016

National Association of Environmentally Responsible
Mold Contractors
2881 West Lake Vista Circle
Davie, FL 33328

Dear National Association of Environmentally Responsible Mold Contractors :

Based on the Department's review of the Examination Evaluation Questionnaire submitted by National Association of Environmentally Responsible Mold Contractors, and having found the examination to be in compliance with Rule 61-31.102, Florida Administrative Code, and §455.217, Florida Statutes, your examination is now approved for the purposes of licensing Mold Assessor, effective April 8, 2015. Congratulations on becoming an approved examination vendor.

Sincerely,

Richard Morrison
Executive Director
Mold-Related Services Licensing Program

DBPR has approved NAERMC's (entity of Gary Rosen) mold licensing exam and training materials, based on NAERMC being recognized by DBPR as a "nationally recognized organization" and authority on mold assessment and remediation.

Dr. Gary Rosen President of NAERMC

Florida DBPR Rule: 61-31.102 Examination

(2) For purposes of Section 468.8414, F.S. "nationally recognized organization" means an organization that has national recognition in the mold assessment or mold remediation industry and certifies persons in the specialty of mold assessment or mold remediation pursuant to standards that have been approved by the Department as substantially equivalent to the requirements of Chapter 468, Part XVI, F.S. and Section 455.217, F.S.

(3) Standards for approval of Mold Assessment examination and Mold Remediation examination:

(b) The mold assessment examination covers the physical sampling and detailed evaluation of data obtained from a building history and inspection to formulate an initial hypothesis about the **origin, identity, location, and extent of amplification of mold** growth greater than 10 square feet.

Rulemaking Authority 455.2035, 455.217(1), 468.8413(5), 468,8424 FS. Law Implemented 455.217, 468.8413, 468.8414 FS. History–New 1-30-14.

The NAERMC mold training and examination covers "formulating an initial hypothesis about the origin, identity, location and extent of mold."

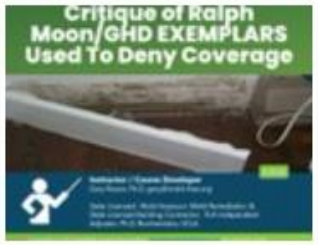
Gary Rosen, Ph.D. (President NAERMC) is solely responsible for the DBPR approved training and exam materials.

Gary Rosen, Ph.D. is therefore a DBPR recognized expert in the field of mold assessment and remediation.

This PowerPoint Is Part of Our Series of Free Advanced Training for Dr. Rosen's Florida Mold Licensees

··· > Optional Advanced Topics > Expert Services Material > **Ralph Moon Critiques**

Critical Analysis of Moo...
2 days ago



Critique of Ralph Moon ...
2 days ago

Fighting Dr. Moon Deni...
2 days ago

Fighting Dr. Moon Deni...
2 days ago

Fighting Dr. Moon Deni...
2 days ago

HOW TO FIGHT PHONY...
3 days ago

[RALPH MOON CRITIQUES - OneDrive (live.com)]

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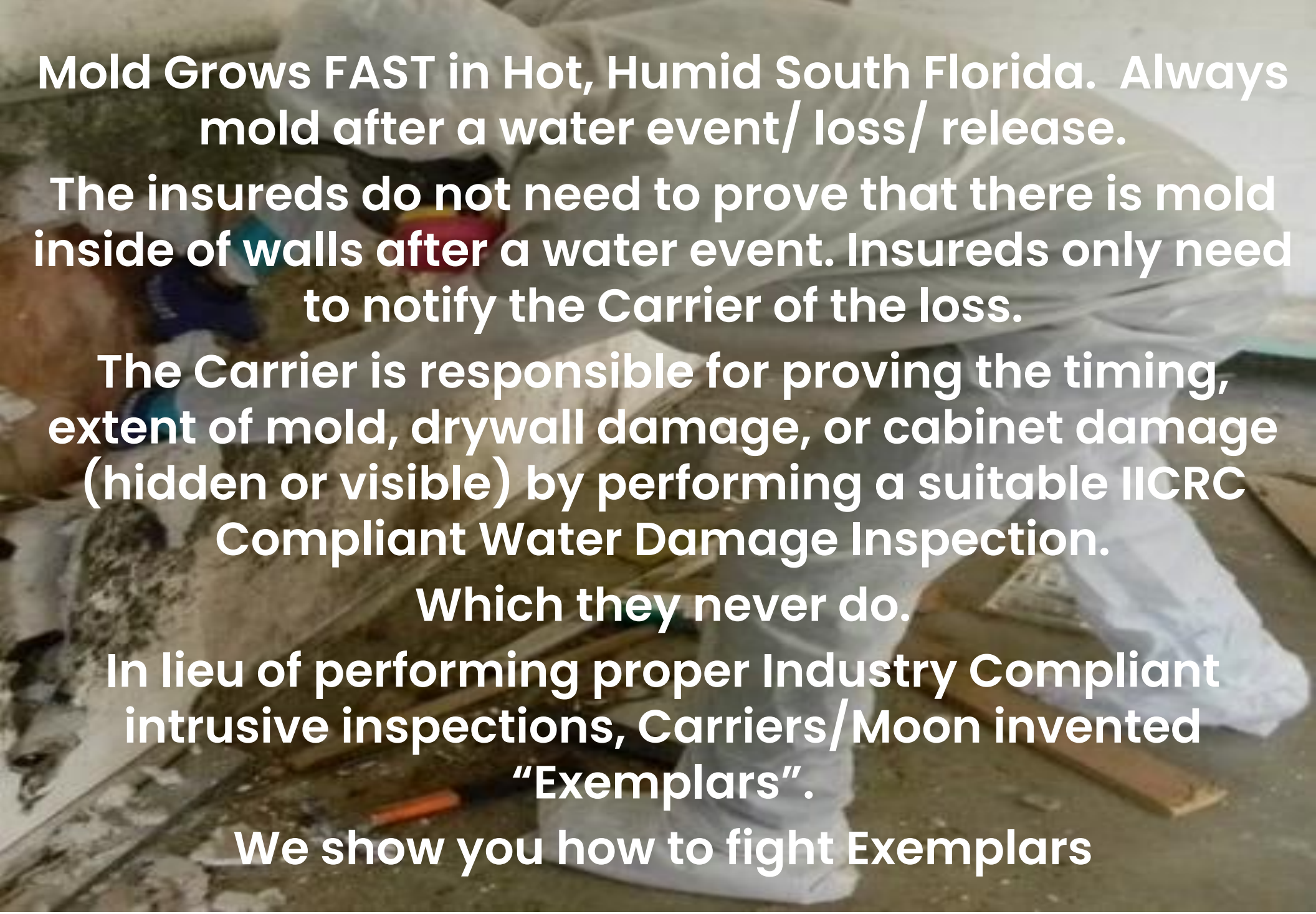
Critique of Moon Exemplars

NAERMC
National Association of Environmentally Responsible Mold Contractors

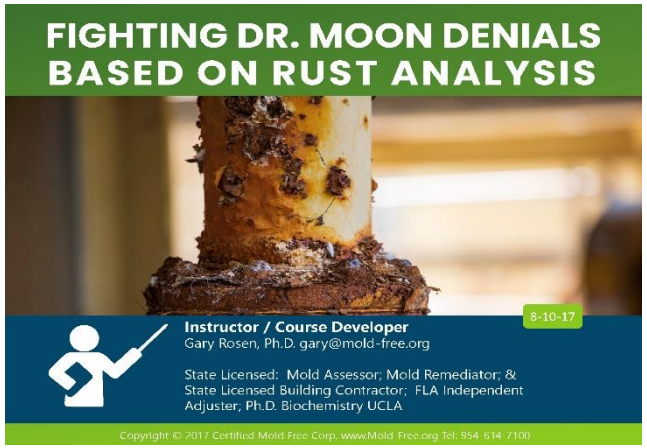
Introduction 01

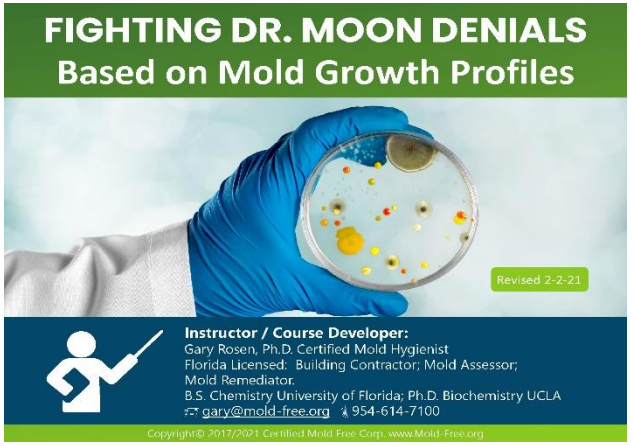
Dr. Ralph Moon/GHD have identified and researched 4 proprietary sets of *exemplars* for the purpose of denying water damage claims based on long term leak exclusion. Rust, Cabinet Swell, Mold Growth, Carpet Tack.



Defense Experts Rely On Proprietary Exemplars. Not Science.

RALPH MOON CRITIQUES - OneDrive (live.com)





- As we have shown in our 3 PowerPoints, and here we review these 3 plus add Critique of Moon Carpet Tack studies:
  - Rather than perform actual, industry compliant, on-site water damage inspections along with science-based testing / analysis …
  - Insurance Carrier (so-called) forensic engineering firms have invented something called "exemplars" which they use to attempt to answer questions about timing of water damage in lieu of actual on-site inspections and science-based testing.

S500 Compliant Inspection = Science

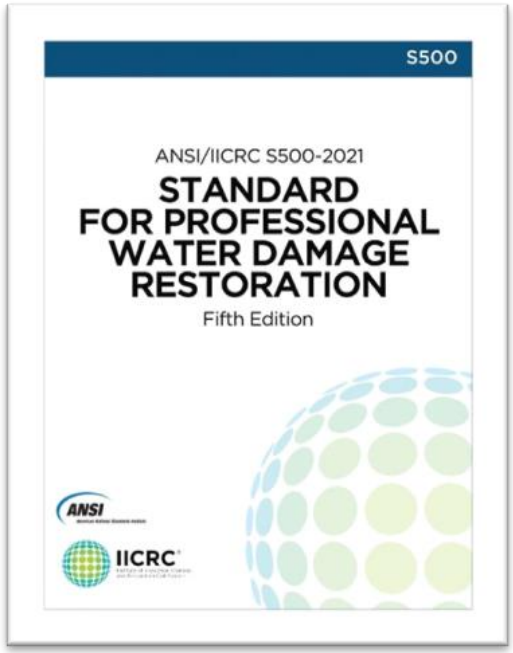
- Our PowerPoint: "*Anatomy Of A $3K ANSI/IICRC S500 Compliant Forensic Water Damage Inspection*".
- Please review. Available free online. Explains:
  - ANSI/IICRC S500 compliant (S500 mandatory) Pre-Drying and Post-Drying water damage inspections. Never performed by Carriers.
  - How testing and analysis methods, as part of S500 compliant **intrusive** inspections, can be used to **scientifically** aid in determining the source, timing, and duration of permanent water damage such as mold and/or cabinet swell/ delamination. Never performed by Carriers.

Anatomy Files - OneDrive (live.com)

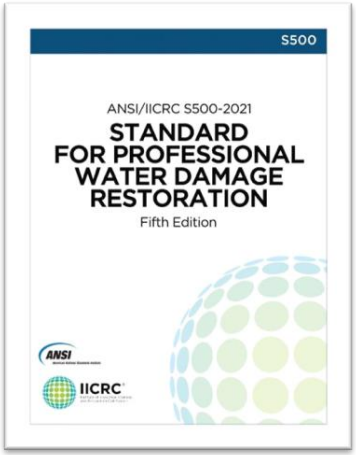
What Is ANSI? What is IICRC S500?

- The American National Standards Institute (ANSI) is a private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.
- There is only one **ANSI-Approved Standard for Professional Water Damage Restoration**.
- **That is ANSI/IICRC S500.**

ANSI
American National Standards Institute



WRT Training for ANSI/IICRC S500



- Based on IICRC S500, the IICRC Approved WRT training and certification course covers the following topics:
  - Principles of Drying, Categories and Classes, Equipment, Supplies, Chemicals, Microorganisms, Health and Safety, Drying Science, **Inspections**, Procedures: Sanitary Water Source, Procedures: Unsanitary Water
- Moon is not IICRC Certified in Water Damage Inspections.

Moon is not IICRC qualified to inspect for water damage.

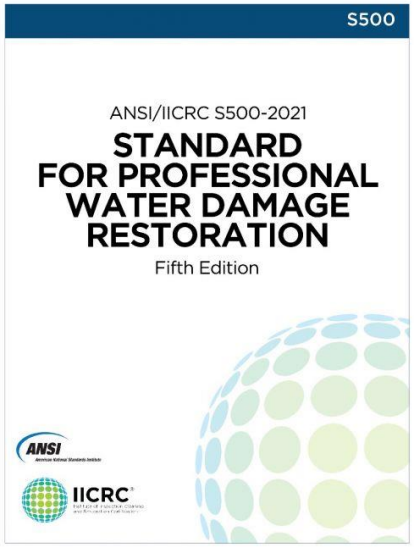
He is a state licensed mold assessor. He tries to make everything about assessing mold, his area of formal training.

DEFINITION: ANSI-Approved IICRC S500-2015/2021 Compliant Water Damage Inspection

1.2.2.1 Initial Water Damage Inspection

*"Restorers **should** inspect and document the source and **time** of the water intrusion, **visible material deterioration**, **pre-existing damage** and **visible microbial growth."***

*"Professional moisture detection equipment should be used to inspect and document the extent of water migration and moisture intrusion **into** building materials and contents."*



Carrier water damage inspections are never Industry Standard (ANSI-Approved) Compliant because they never check inside walls and assemblies for the **timing** of **visible material deterioration, pre-existing damage** and/or **visible microbial growth** as required by IICRC (says "should".)

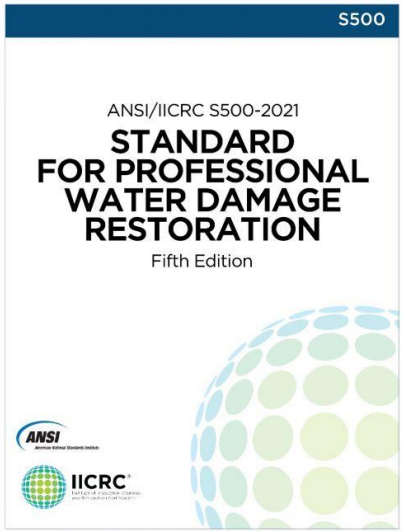
Ask the Carrier so-called water damage expert being deposed how often he has testified when the Carrier had earlier performed an IICRC S500 compliant water damage inspection? The answer will be: NEVER.

Water Damage Inspections are Intrusive.

17.3.1 Pre-restoration Evaluation of assemblies

*"Evaluating layers or assemblies of materials **should** be done when it is suspected that water has migrated **under** or **into** it…*

"Properly inspecting … these assemblies can require removal of surface or multiple layers of them."



Without such an S500 required (says "should") intrusive inspection, the Carriers and their consultants rely on red herrings, obfuscation, and other disreputable tactics to deny claims.

Methods and conclusions are wrapped in complex reports, charts, graphs, **with multiple references that are falsely called "peer reviewed".**

All in an attempt to make their proprietary junk science untouchable. And thereby try to make their conclusion (deny coverage) untouchable.

Rapid Response Required

12.2.1 Rapid Response

"... With extended exposure to moisture, some materials undergo permanent damage that ***could have been partially or completely prevented with a more rapid response.***

"In addition, in most environments ***the extended presence of water or excessive humidity can lead to microbial (e.g., bacteria and mold) amplification*** *that can cause general deterioration of environmental conditions over time,* ***potentially leading to significant health and safety hazards for workers and occupants. "****(S500-2021 page 58).*

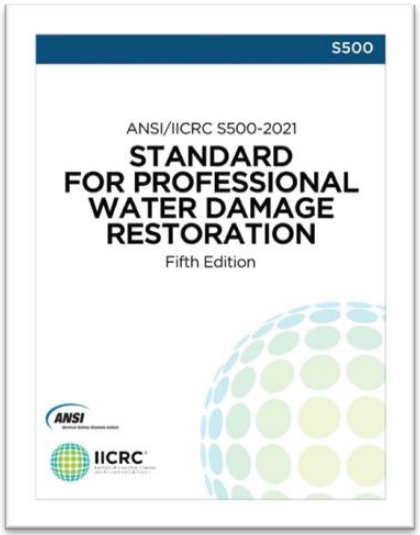
S500 requires rapid response to avoid mold growth. But since microbial growth happens within days, how often is the response rapid enough to avoid such permanent damage that triggers remove/replace instead of drying? NEVER.

That's why in our industry there are no Carrier S500 compliant inspections either before or after drying.

Carriers apparently do not care about occupant health. They always dry without inspecting, and then cover up mold with illegally applied biocides and Kilz.

There Is A Lot More To S500 Restoration than Drying

- ANSI/IICRC S500 is not the "drying" standard. It is the *Standard for Professional Water Damage Restoration* and in addition to **Drying**, includes procedures, for both:
  - **Inspecting:** S500 compliant/defined Water Damage Inspections.
  - **Remediating/Removing**: S500 compliant Remediation/Removal, that applies when drying cannot restore to as new for example if there is mold growth or cabinet swelling/delamination.
- Carriers say they are Industry Standard Compliant but they never are.



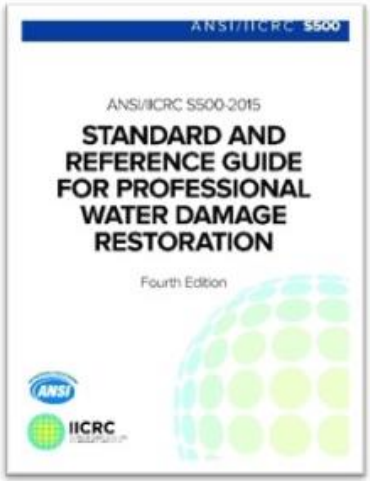
Carriers will not pay for Inspections that are compliant with S500 because it costs more to comply than not to comply. Why?

ANSI/IICRC COMPLIANT INSPECTIONS. EXPENSIVE.

- The industry required ANSI/IICRC S500 Water Damage Inspections as defined by the standard are **intrusive**.
- To be compliant one **must** remove baseboards, open walls, and check behind toe kicks and under cabinets (using appropriate environmental controls).
- Carriers never perform such inspections.
- Why not? Because it costs more to open walls to inspect both inside and out than to perform surface only inspections.

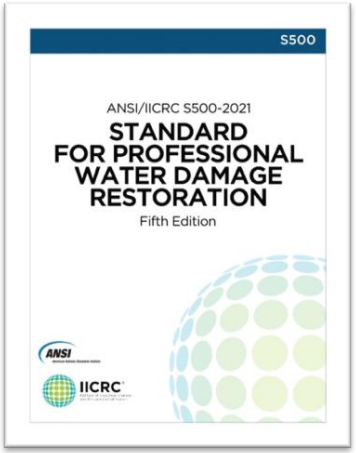
1.2.2.1 Initial Inspection. (Part 2)

... Professional moisture detection equipment **should** be used to inspect and document **the extent of water migration** and moisture intrusion **into** building materials and contents.



ANSI/IICRC COMPLIANCE. EXPENSIVE. WHY?

- Not only are S500 intrusive inspections far more expensive than visual / surface-only inspections…
- But also, intrusive water damage inspections **almost always find mold growth** (Category 3 microbial contaminated water damage) triggering costly remediation/removal rather than low-cost (surface only) In Place Drying.

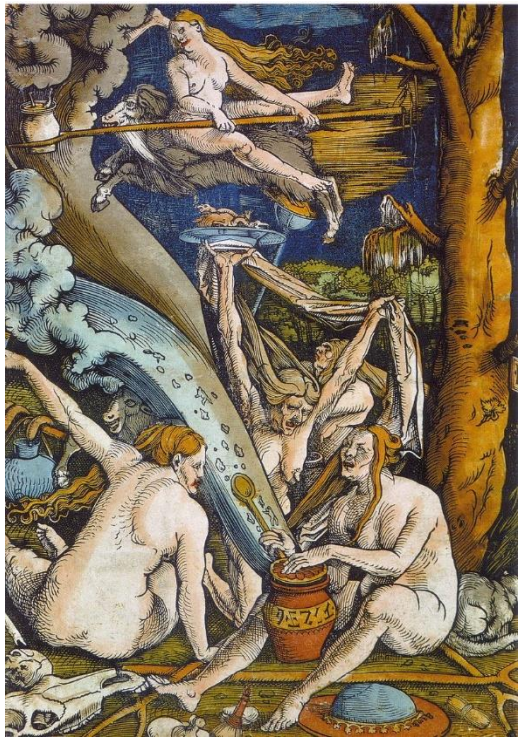


Instead of performing mandatory ANSI/IICRC S500 defined (intrusive) inspections, Carriers dry in place (they dry mold) until surfaces test dry, followed by biocide spraying to cover up odor; followed by Kilz to cover up stains. This is FRAUD.

Defense Expert's Exemplars = Witchcraft. Not Science

Carriers do not allow / pay for S500 compliant, timely, intrusive water damage inspections.

- **As a result:** Carrier "experts" cannot directly test materials, in a timely manner, to scientifically determine (or attempt to determine) timing and duration of damage (as explained in our "Anatomy" PowerPoint)
- **Instead:** Carrier "experts" resort to witchcraft (the use of proprietary / invented comparison pictures.)
- **For example:** Using proprietary, unsourced, non-published, not peer reviewed, comparison pictures of mold growth (they call them exemplars) to "determine" that pictures of the insured's mold growth are proof of long-term damage: Deny Claim.



Defense Experts Prefer to Use The Term Exemplar

- Carriers prefer to use the term “exemplars” instead of “proprietary, unsourced, non-published, non-peer reviewed comparison pictures”.
- “Exemplars” is not only easier to say but “exemplars” sounds so very scientific and professional.
- Carriers completely distort the use of the word “exemplars”.

Defense Expert's Exemplars = Witchcraft. Not Science.

ex'em.plar

/ig'zemplar,ig'zemplar/

noun

A person or thing serving as a typical example or **excellent model**. "he became the leading exemplar of conservation philosophy" synonyms: epitome, **perfect example** synonyms: epitome, perfect example, paragon, **ideal**, exemplification, textbook example, embodiment, essence, quintessence.

Excellent model; perfect example; ideal are some of the words to describe "exemplar".

Perfect model: Studies on mold growth, rust, particle board swell that took place in Dr. Moon's office 10-15 years ago claimed to somehow manage to be applicable to any home in the future.

Their use is more akin to witchcraft than to science and we will so prove.

Moon's Current Employer NV5 Goes One Step Further. All Testing is Claimed to Be Per ASTM (NV5 Web Site)

FORENSIC ENGINEERING & BUILDING CONSULTING:
FORENSIC RESEARCH & TESTING PROGRAM

The NV5 Forensic Engineering & Building Consulting team has an established research and testing program that focused on examining the duration of loss on various construction materials. The program was prompted by the question asked before all insurance investigations, "When and how long did the loss occur?"

Many water losses are the result of long-term, low volume releases. However, in our test program, we exposed wood and metal exemplars to both continuous and repeated sources of moisture to create the "worst case" conditions for comparison to the damaged materials in the claim. This approach simulated the shortest period of time necessary to cause observed damage.

All of the research protocols follow published ASTM test procedures. This was necessary to elevate the credibility of the research results as well as provide a method for others to recreate the test conditions.

- Per NV5: Moon studies did not produce exemplars at all. Worst case conditions. Not in any way useful. Challenge Moon on this.
- Per NV5: A preposterous statement (they just made this up), that all Moon research follows published ASTM procedures. Complete non-sense. Addressed in our Appendix A. Challenge Moon on this.

How Do Carrier Forensic Engineering Companies Get People to Accept Witchcraft In Lieu of Science. They Call Their Work "*Published| Peer Reviewed*"

- When an article (even the worst junk science) is called *"Published"* and *"Peer Reviewed"* it is considered blessed / untouchable / not able to be criticized.
- Any time you critique the (what they call *"Published/Peer Reviewed"*) article, the defense attorney will ask: Why do you think your non-peer reviewed, unpublished comments can be used to comment on [Moon's] peer reviewed, published studies?
- So Carrier Forensic Engineering Companies call everything *"Published/Peer Reviewed."*

Peer Review According to the Office of Science and Technology (OST)

USE OF THE TERM "PEER REVIEW"

"One such problem has been the OST's [Office of Science and Technology] use of the term "peer review" to refer to technical reviews conducted by EM technical staff or other reviewers not independent of the project under review. Such use of the term "peer review" has caused confusion and misunderstanding within both OST and external review groups (e.g., NRC, GAO), which have continued to criticize OST for a lack of a credible peer review program.

"To avoid misunderstanding, OST should restrict the term "peer review" to only those technical reviews conducted by independent, external experts. "


Peer Review in the Department of Energy-Office of Science and Technology: Interim Report

Peer Review in the Department of Energy-Office of Science and Technology

Interim Report

Committee on the Department of Energy-Office of Science and Technology's Peer Review Program
Board on Radioactive Waste Management
Commission on Geosciences, Environment, and Resources
National Research Council

NATIONAL ACADEMY PRESS
Washington, D.C. 1997

https://www.nap.edu/download/5939#

Restrict the term "peer review" to only those technical reviews conducted by **independent, external** experts.

None of the Moon papers on mold, cabinet swell, rust or carpet tack meet this criteria. None are considered "peer reviewed" as defined in the scientific community.

Moon/GHD Studies. Not Reproducible. Or Reproduced

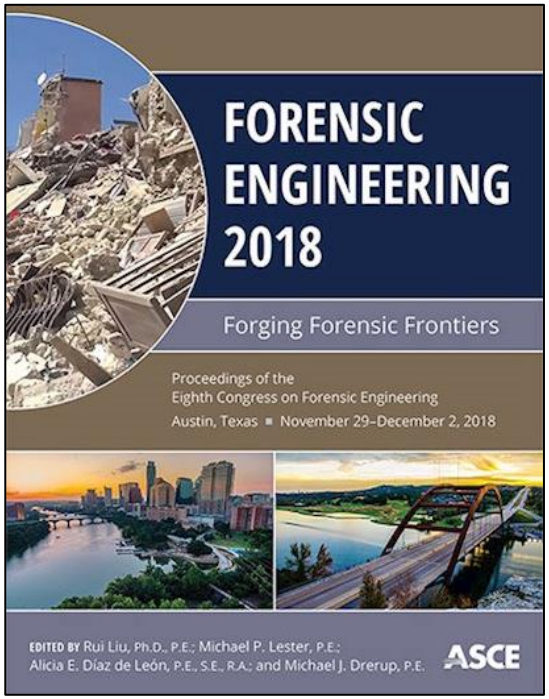
Moon/GHD's studies were all based on one off experiments.

- They did not repeat any of the experiments.
- Nor were they ever reproduced by others.
- Nor can the work be reproduced by others as Moon did not provide enough information to do so, as we will show.
- The work does not in any way meet the requirements by the National Academy of Science in terms of Reproducibility and Replicability.
- **See Appendixes A-C: World renown 3rd party subject matter experts independently Peer Reviewed Moon's Mold Growth and Cabinet damage studies.**
- **Their conclusions: Junk Science.**

https://www.ncbi.nlm.nih.gov/books/NBK547537/pdf/Bookshelf_NBK547537.pdf

Nothing Presented by Moon/GHD/HSA Is Peer Reviewed by Independent, External Experts

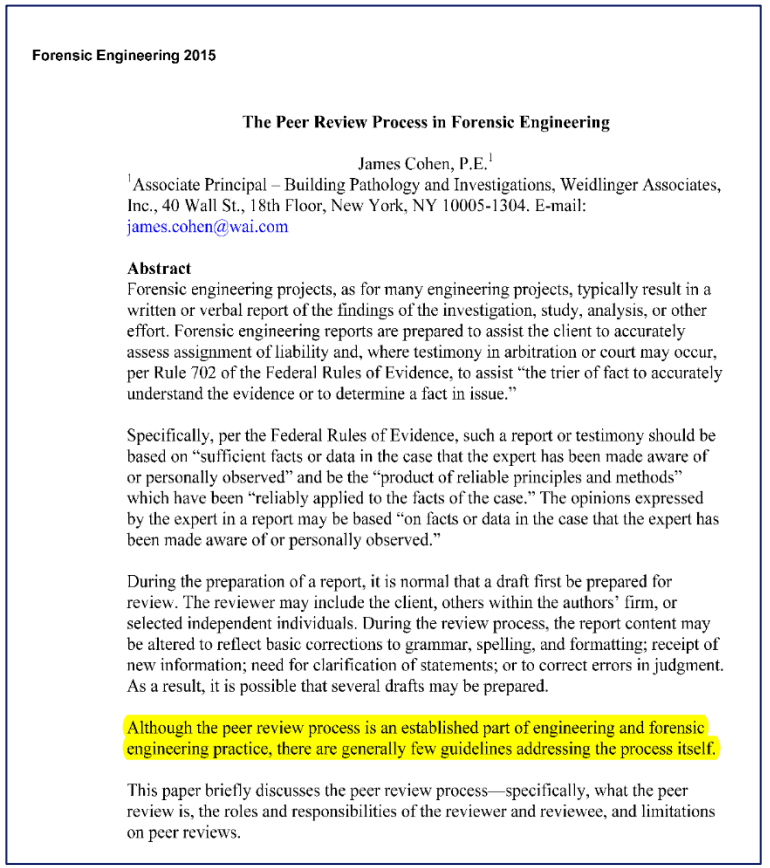
- Moon's studies are presented **orally** at Forensic Engineering Symposiums.
- And then written up and posted on-line in *Forensic Engineering Proceedings* to give them the stamp of respectability.
- The work always includes many charts and figures in order to appear to be scientific looking.
- But charts and graphs do not = Peer Reviewed.
- None meet the criteria of Peer Reviewed according to the scientific community.



Let's see how Forensic Engineering defines Peer Review.

Forensic Engineering: "There are generally few guidelines for addressing the process of peer review."

- The Moon/GHD/HSA articles we review were presented orally at *Forensic Engineering* conferences and are the basis for their use of "exemplars" to determine timing of water damage — instead of performing timely, intrusive, IICRC compliant Water Damage Inspections where they directly analyze/test the materials in order to date the damage.
- *Forensic Engineering* states with regard to the Peer Review process: "There are generally few guidelines for addressing the process of peer review."



Forensic Engineering 2015

The Peer Review Process in Forensic Engineering

James Cohen, P.E.[1]
[1]Associate Principal – Building Pathology and Investigations, Weidlinger Associates, Inc., 40 Wall St., 18th Floor, New York, NY 10005-1304. E-mail: james.cohen@wai.com

Abstract
Forensic engineering projects, as for many engineering projects, typically result in a written or verbal report of the findings of the investigation, study, analysis, or other effort. Forensic engineering reports are prepared to assist the client to accurately assess assignment of liability and, where testimony in arbitration or court may occur, per Rule 702 of the Federal Rules of Evidence, to assist "the trier of fact to accurately understand the evidence or to determine a fact in issue."

Specifically, per the Federal Rules of Evidence, such a report or testimony should be based on "sufficient facts or data in the case that the expert has been made aware of or personally observed" and be the "product of reliable principles and methods" which have been "reliably applied to the facts of the case." The opinions expressed by the expert in a report may be based "on facts or data in the case that the expert has been made aware of or personally observed."

During the preparation of a report, it is normal that a draft first be prepared for review. The reviewer may include the client, others within the authors' firm, or selected independent individuals. During the review process, the report content may be altered to reflect basic corrections to grammar, spelling, and formatting; receipt of new information; need for clarification of statements; or to correct errors in judgment. As a result, it is possible that several drafts may be prepared.

Although the peer review process is an established part of engineering and forensic engineering practice, there are generally few guidelines addressing the process itself.

This paper briefly discusses the peer review process—specifically, what the peer review is, the roles and responsibilities of the reviewer and reviewee, and limitations on peer reviews.

That is not true. But clearly is true for *Forensic Engineering* journal where Moon/GHD/ HSA oral presentations at Conferences are "published" and called "peer reviewed." Easy to do if Forensic Engineering does no have any guidelines for Peer Review.

None of the Moon/GHD/HSA Articles Printed in *Forensic Engineering* Meet Their Own Manuscript Professional Guidelines

ASCE MANUSCRIPT SUBMISSION AND REVISION REQUIREMENTS

- The manuscript title, author byline, and abstract are on the first page of your manuscript text. Authors should make sure the byline listed on the manuscript matches what they have entered in Editorial Manager.
- All authors have separate affiliation statements. The corresponding author should be noted. An email address is required for the corresponding author and encouraged for all authors.
- The manuscript is in a double-spaced, single-column format with **continuous line numbering**.
- All figures and tables are included.
- Initial submissions may be in Microsoft Word, LaTeX, or PDF.
- All required submission questions must be answered.
- Funding for the research must be declared accurately via the funder selection tool provided in Editorial Manager as well as in the Acknowledgments.

- But Forensic Engineering does have some important requirements for manuscript submission. See last bullet above.
- None of Moon/GHD/HSA *Forensic Engineering* submissions comply with these absolutely critical requirements:
  - They don't acknowledge conflict of interest (GHD/HSA are insurance defense engineering firms) or source of funding (insurance Carriers.)

Moon/GHD/HSA write ups of *Forensic Engineering* presentations do not comply with *Forensic Engineering's* own conflict of interest disclosure requirements.

Moon's Phony Definition of "Peer Review": ONLY About Appropriateness for Publication.

Q. And we both agreed on a working understanding of what a peer review is; did we not?

A. I don't think we agreed upon it. Usually in the context of the ASCE, it's multiple members of a review panel of which usually three, whom I don't know, review it independently and write comments as to its appropriateness for publication.

[MOON's DEFINITION OF PEER REVIEW.]

Moon's definition of Peer Review extracted from a deposition under oath.

Moon defines Peer Review: ONLY About Appropriateness for Publication.

Not scientific. Cannot survive Daubert Challenge.

Moon's Phony Definition of "Peer Review": ONLY About Appropriateness for Publication

Q. Peer reviewed by who?

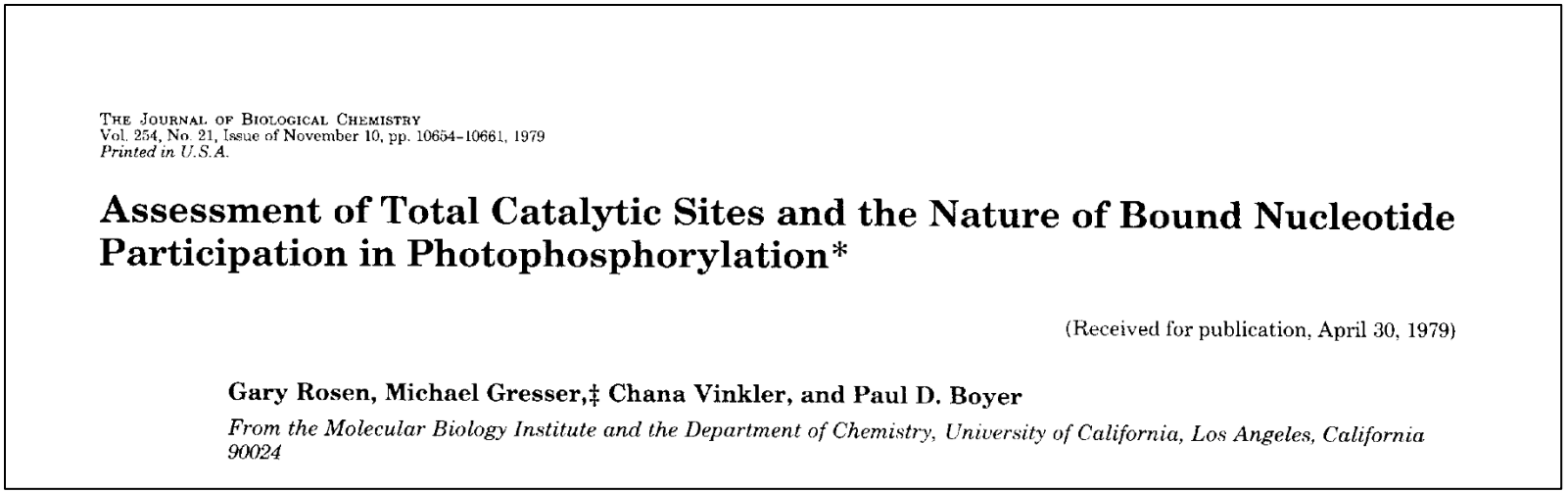
A. Whenever you have a conference you have a period of abstract review, acceptance, submittal of articles and an acceptance and there's a board, a review board that goes over the papers and agrees whether they should accept it or not and that's typical of science meetings, they go through that process. **[MOON's DEFINITION OF PEER REVIEW.]**

2nd Quote Same Depo. Moon's definition of Peer Review extracted from a deposition under oath.

Moon defines Peer Review: ONLY About Appropriateness for Publication.

Not scientific. Cannot survive Daubert Challenge.

What Does Dr. Rosen Know About The Peer Review Process



THE JOURNAL OF BIOLOGICAL CHEMISTRY
Vol. 254, No. 21, Issue of November 10, pp. 10654–10661, 1979
Printed in U.S.A.

Assessment of Total Catalytic Sites and the Nature of Bound Nucleotide Participation in Photophosphorylation*

(Received for publication, April 30, 1979)

Gary Rosen, Michael Gresser,‡ Chana Vinkler, and Paul D. Boyer

From the Molecular Biology Institute and the Department of Chemistry, University of California, Los Angeles, California 90024

- Dr. Rosen worked in the UCLA research lab of Nobel Laureate Paul D. Boyer for 5 years.
- During that time, Dr. Rosen published Peer Reviewed research and had Peer Reviewed literarily hundreds of articles.
- Dr. Rosen also performs peer reviews for the:

Rust 02

We review work by Dr. Moon/GHD that uses proprietary rust *exemplars* to inappropriately deny coverage. We highlight findings from our earlier PowerPoint next.

RALPH MOON CRITIQUES - OneDrive (live.com)

Dr. Moon & GHD: *Metal Corrosion: A Qualitative Analysis*

Metal Corrosion: A Qualitative Analysis

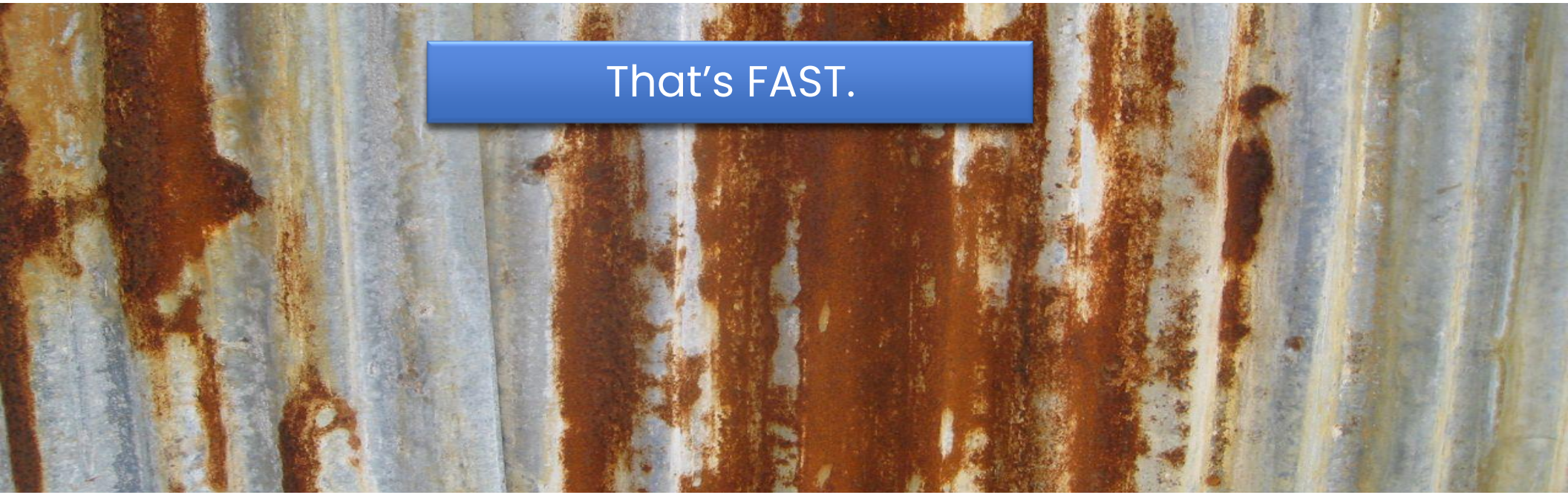
N.Wells; C.A. Martinez; M, Bass; and R.E. Moon
GHD*, Building Science Dept.,
4019 East Fowler Ave., Tampa, FL 33617.
Published Online Nov 9, 2015

GHD*: Insurance defense forensic engineering firm

GHD Results: Sample Set #1. Rust is FAST.

Per GHD: "Rust occurred on the cut ends of the fresh water corner bead on day 13 and on day 22 for the salt water. Rust occurred on the cut end of the fresh water sill plate on day 21 and 27 for the salt water."

- GHD Sample Set #1: This study, by insurance defense engineering firm GHD and Moon, immersed metal/steel corner bead and metal/steel sill plate (bottom framing track) in water and found that rust occurred very quickly (2-3 weeks).



GHD: Sample Set #2. Painted Ends With Rust-Oleum.

Per GHD: "In subsequent tests a metal primer (Rust-Oleum) was applied on the cut edges to a height of three millimeters. After the primer dried the test specimen surfaces were cleaned with acetone to remove any surface contaminates."

The rust formed very fast with Sample Set #1 starting at cut ends. So for the second sample set, they **painted the cut ends with Rust-Oleum** and there was no corrosion out to day 43.

This is the Exemplar that Moon/GHD use to determine duration of water damage in Florida homes: Metal painted with Rust-Oleum. Since there was no rust at Day 43, if there is rust in a home conclude: Duration of water exposure is at least 43 days (long-term). Deny claim due to long term damage.

Metal painted with Rust-Oleum. No corrosion in 43 days.
This is a great advertisement for Rust-Oleum but what does this have to do with measuring corrosion on metal framing and corner bead that always starts at non-galvanized cut ends?
What does this have to do with the real world?
Nothing. This experiment is nothing more than voodoo/witch craft.

GHD Study Sealed Cut Ends With Rust-Oleum. Second Set.

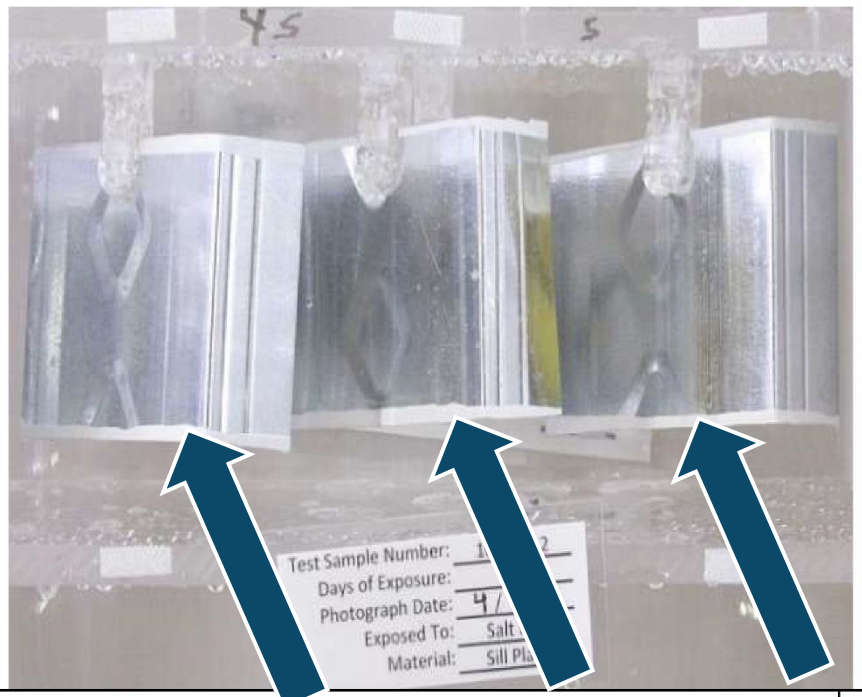


Photo 5: Sill plate in salt water Day 0

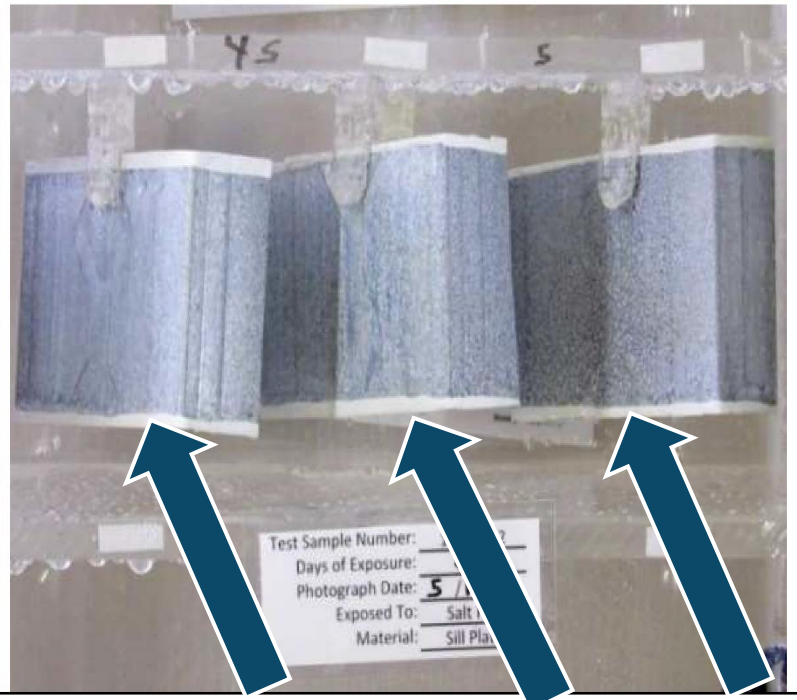


Photo 6: Sill plate on Day 43 in salt water

Moon/GHD sealed cut ends of 2nd Sample Set. This is the Exemplar they use to deny coverage.

Exemplars. Not.

- For Moon/GHD, spraying the cut ends of metal (corner bead and framing bottom track/ sill plate) with Rust-Oleum is what they call an Exemplar: A perfect or excellent example/ model for what occurs in a home. Not.
- Calling metal construction materials that are sprayed with Rust-Oleum "Exemplars" so they do not rust in order to deny legitimate claims — this is so over the top — you couldn't make this up if you tried.

Moon Denial of Coverage. Exemplars

> Per Moon Analysis of *John Doe* Kitchen Claim: "A second Peer Reviewed study on the corrosion of galvanized steel materials revealed that the extent of oxidation documented on galvanized steel framing inside the *John Doe* kitchen wall was comparable to research **exemplars** exposed individually to either fresh water or salt water mists, elevated humidity and ambient conditions over a 60 day period (Wells et al., 2015)."

- Example of a case a few years back where Moon references the GHD study (Wells et al., 2015) and states "*comparable to research exemplars*" in order to deny coverage.
- How many homes are built with metal framing (studs/sill plates) and metal corner bead that have cut ends sprayed with Rust-Oleum. Zero of course.
- When I say that this is witchcraft or voodoo or fake/junk science, these are very kind words to describe this assault on Florida homeowners.

Cabinet Swell

03

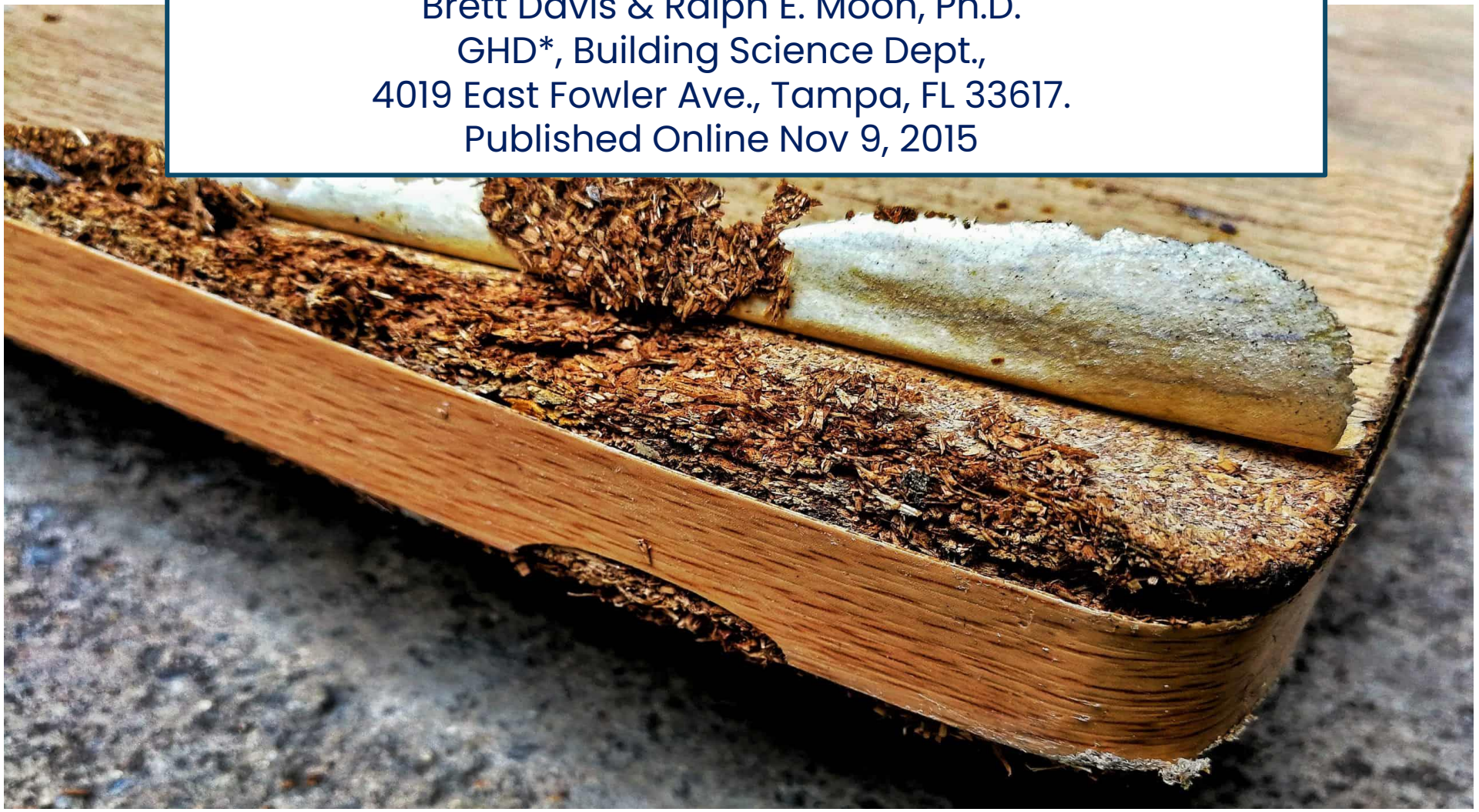
We review work by Moon/GHD that uses cabinet swelling *exemplars* to deny coverage. We highlight findings from our earlier PowerPoint below.

RALPH MOON CRITIQUES - OneDrive (live.com)

Dr. Moon & GHD: *Thickness Swell*

Thickness Swell in Particle Board: A Forensic Tool for the Duration of Loss

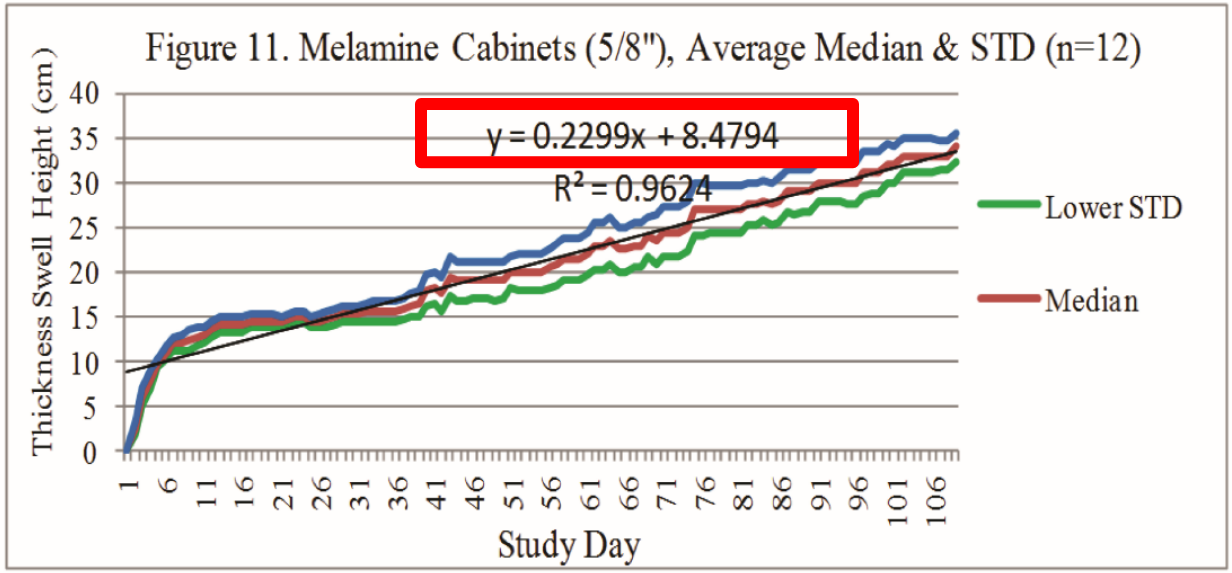
Brett Davis & Ralph E. Moon, Ph.D.
GHD*, Building Science Dept.,
4019 East Fowler Ave., Tampa, FL 33617.
Published Online Nov 9, 2015



GHD*: Insurance forensic engineering defense firm

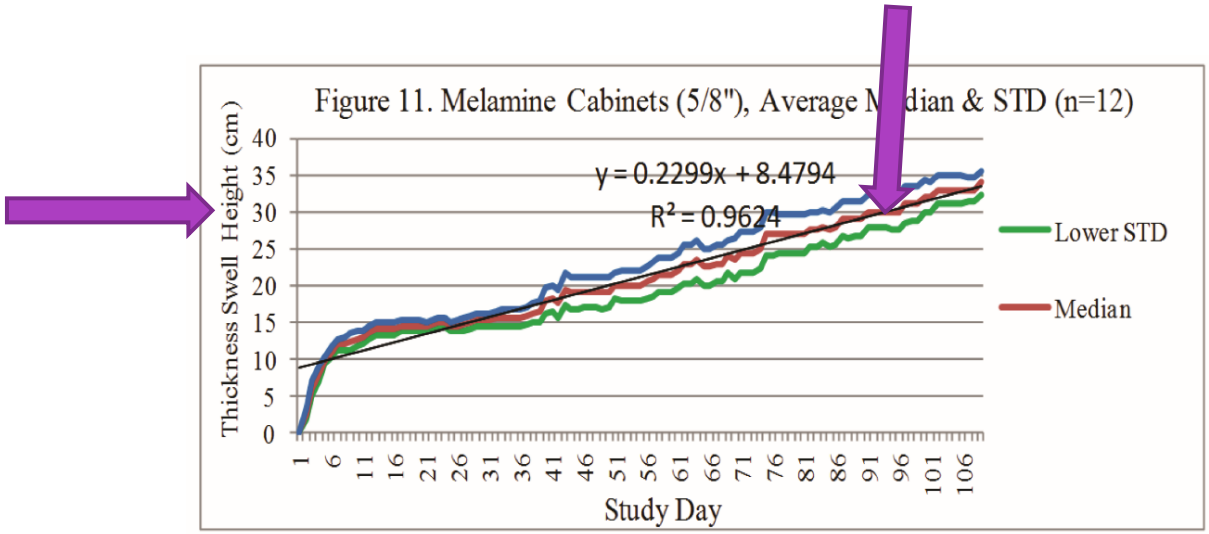
Determining the Duration of Water Exposure

- For Moon/GHD's *Thickness Swell in Particle Board: A Forensic Tool for the Duration of Loss (published 2015).*
  - They measured cabinet leg Thickness Swell (TS) after water exposure.
  - Then they developed an equation (red box below) so one could after a water release: 1.) Measure Thickness Swell (TS); 2.) Plug TS number into the equation. 3.) Get the corresponding (long term) duration of water exposure. 4.) Deny claim.



Determining the Duration of Water Exposure

- For the Moon/GHD graph below, if they measured a Thickness Swell of 30 cm this would correspond to a duration of water exposure of approximately 95 days for which Moon claims a 96% (R^2 = 0.9624) accuracy **even though the line does not in any way describe the first 14 days which is all that matters**.
- Moon would therefore conclude: Water exposure was long term (and not less than 14 days), deny coverage due to long term damage exclusion.
- Of course, this is a red herring as the only issue about coverage is the timing of permanent damage. And the graph shows massive damage before Day 14.



Furthermore, from Moon Drip, Drip, Drip

http://clmmag.theclm.org/home/article/drip-drip-drip

Drip, Drip, Drip 8-30-2011

A look at the inside of a cabinet can reveal whether water damage resulted from a one-time event or a chronic leak.

By Ralph E. Moon, Ph.D., CHMM, CIAQP

As the kitchen cabinet doors swung open, the familiar odor of dampness and mold hit like a wet gym sock. "That damage just happened," remarked the insured.

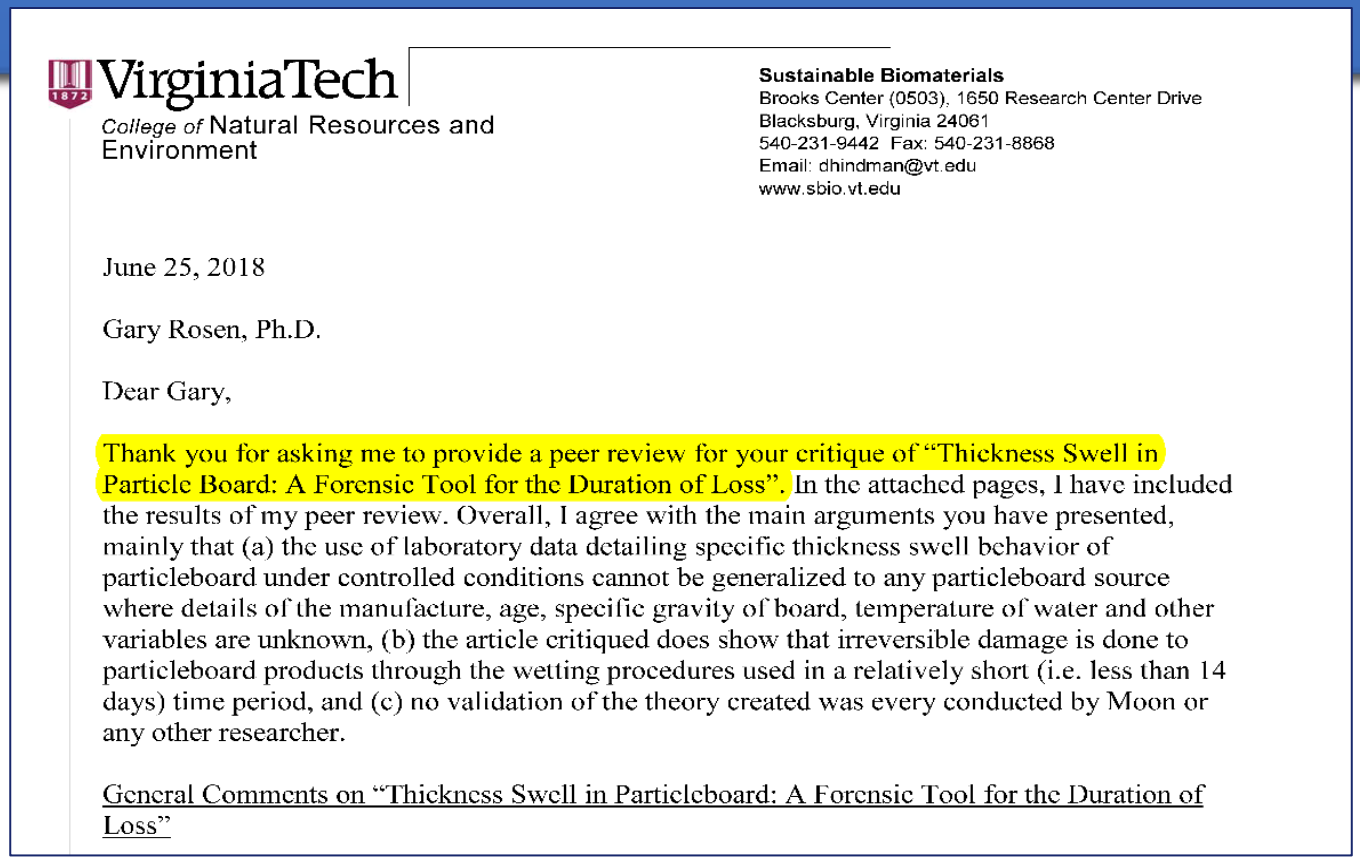
Other Observable Phenomena

In the first experiment, all of the unfaced particleboard bases supported prolific microbial growth after Day 11. The extent to which microbial growth weakened the unfaced particleboard is unknown; however, previous experiments with unfaced particleboard

- Furthermore: Page 2, Moon *Drip, Drip, Drip* article. All unfaced particle board (bottoms of cabinet legs always unfaced) supported prolific mold growth after Day 11.
- As a result, cabinets must be discarded. Triggers coverage regardless of duration of water exposure and regardless of extent of Thickness Swell.
- This earlier Moon work was **not referenced** in Moon's 2015 study!

Moon/GHD Conclusions Flawed. But Data Valuable

- We had this Moon/GHD presentation Peer Reviewed by noted composite wood expert Professor Hindman. See **Appendix A** for Hindman review and his C.V.
- Hindman: Moon/GHD methodology severely flawed. Not Science.



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540-231-9442 Fax: 540-231-8868
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June 25, 2018

Gary Rosen, Ph.D.

Dear Gary,

Thank you for asking me to provide a peer review for your critique of "Thickness Swell in Particle Board: A Forensic Tool for the Duration of Loss". In the attached pages, I have included the results of my peer review. Overall, I agree with the main arguments you have presented, mainly that (a) the use of laboratory data detailing specific thickness swell behavior of particleboard under controlled conditions cannot be generalized to any particleboard source where details of the manufacture, age, specific gravity of board, temperature of water and other variables are unknown, (b) the article critiqued does show that irreversible damage is done to particleboard products through the wetting procedures used in a relatively short (i.e. less than 14 days) time period, and (c) no validation of the theory created was every conducted by Moon or any other researcher.

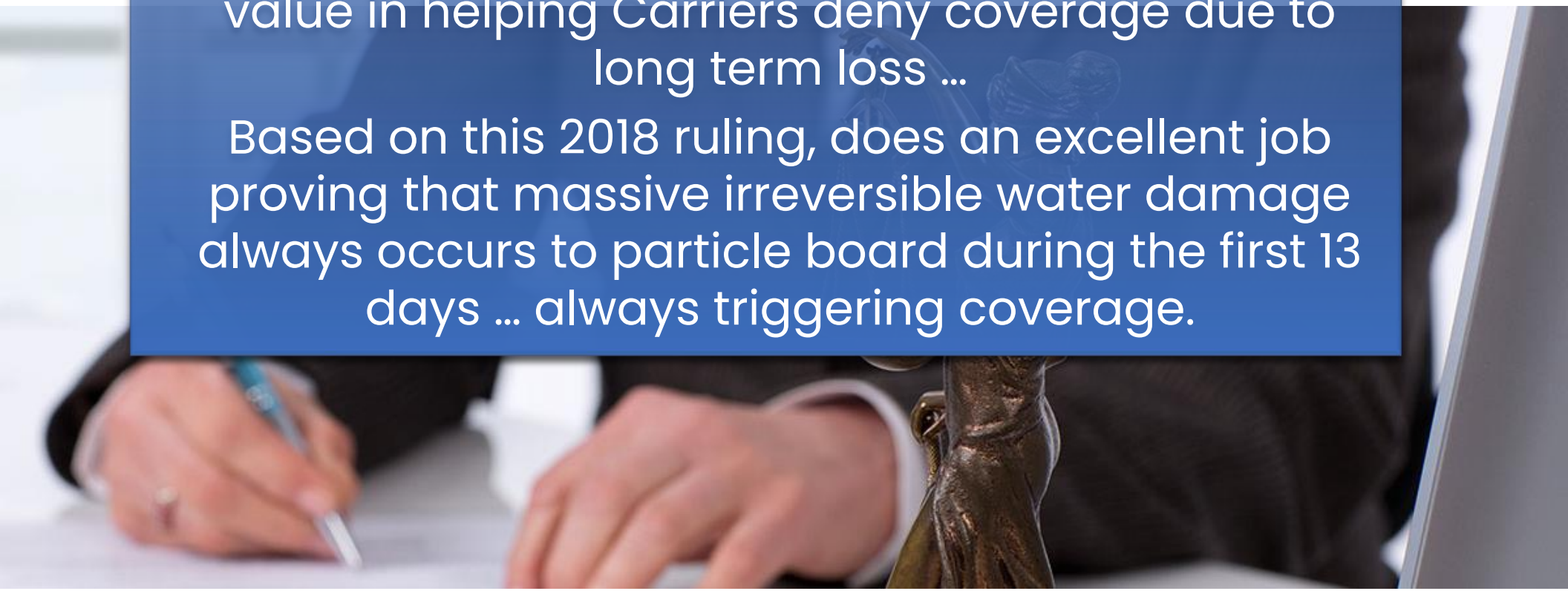
General Comments on "Thickness Swell in Particleboard: A Forensic Tool for the Duration of Loss"

Moon/GHD With Respect to: 5th DCA 2018 Ruling

Per FLA 5th DCA 2018 ruling, if there is permanent damage before Day 14, coverage is triggered. That there may be additional damage after Day 13 does not in any way result in coverage denial.

The Moon/GHD (2015) study rather than being of value in helping Carriers deny coverage due to long term loss …

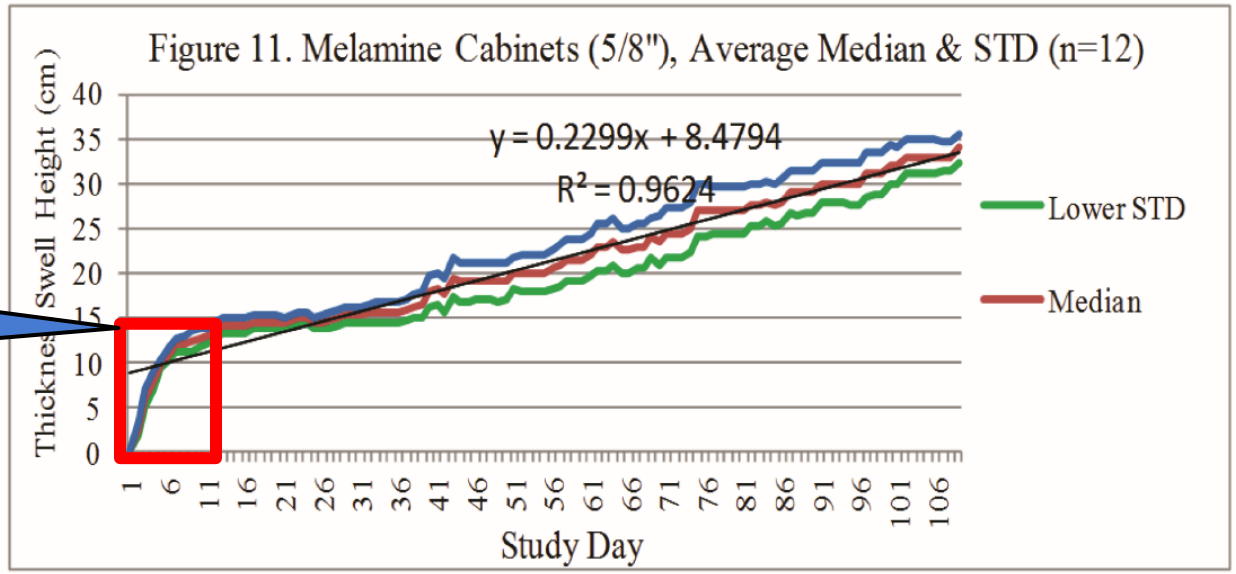
Based on this 2018 ruling, does an excellent job proving that massive irreversible water damage always occurs to particle board during the first 13 days … always triggering coverage.



Huge Irreversible Permanent Damage < Day 14

- The Moon/GHD study shows, over and over, a massive swelling spike (permanent damage) before day 14 that triggers coverage. For example, see Moon's Fig 11 below from their Study.
- Additional damage after Day 13, has no impact on coverage.
- The cabinet legs are irreversibly damaged almost immediately (well before day 13) and **additional swelling (additional permanent damage) is irrelevant to coverage determination. You have to replace the cabinets.**

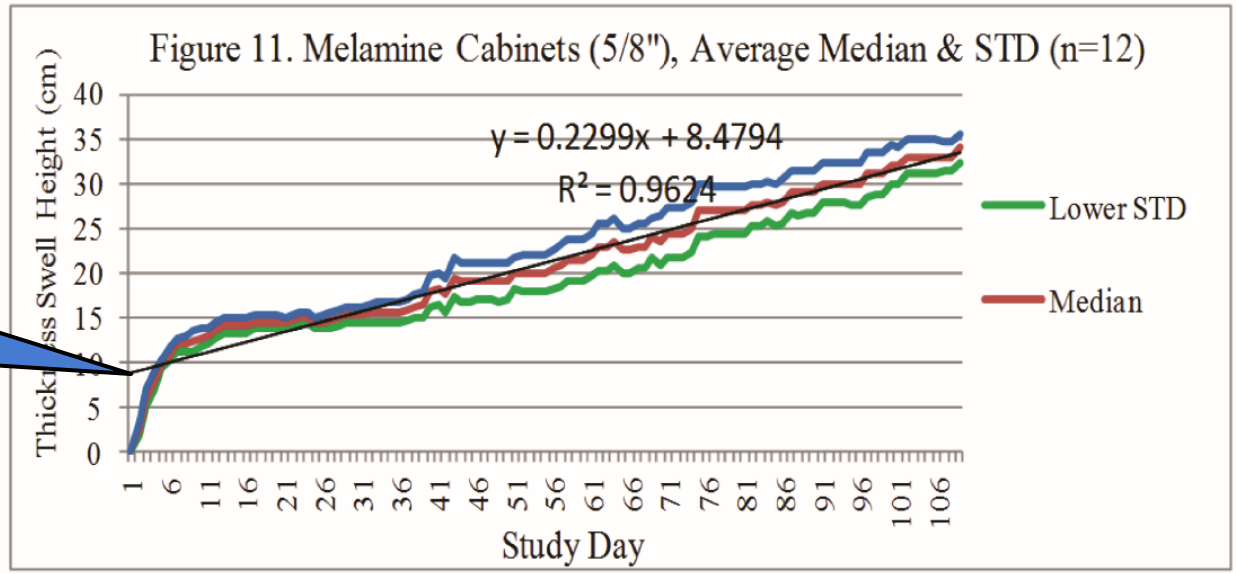
Permanent Damage by Day 14



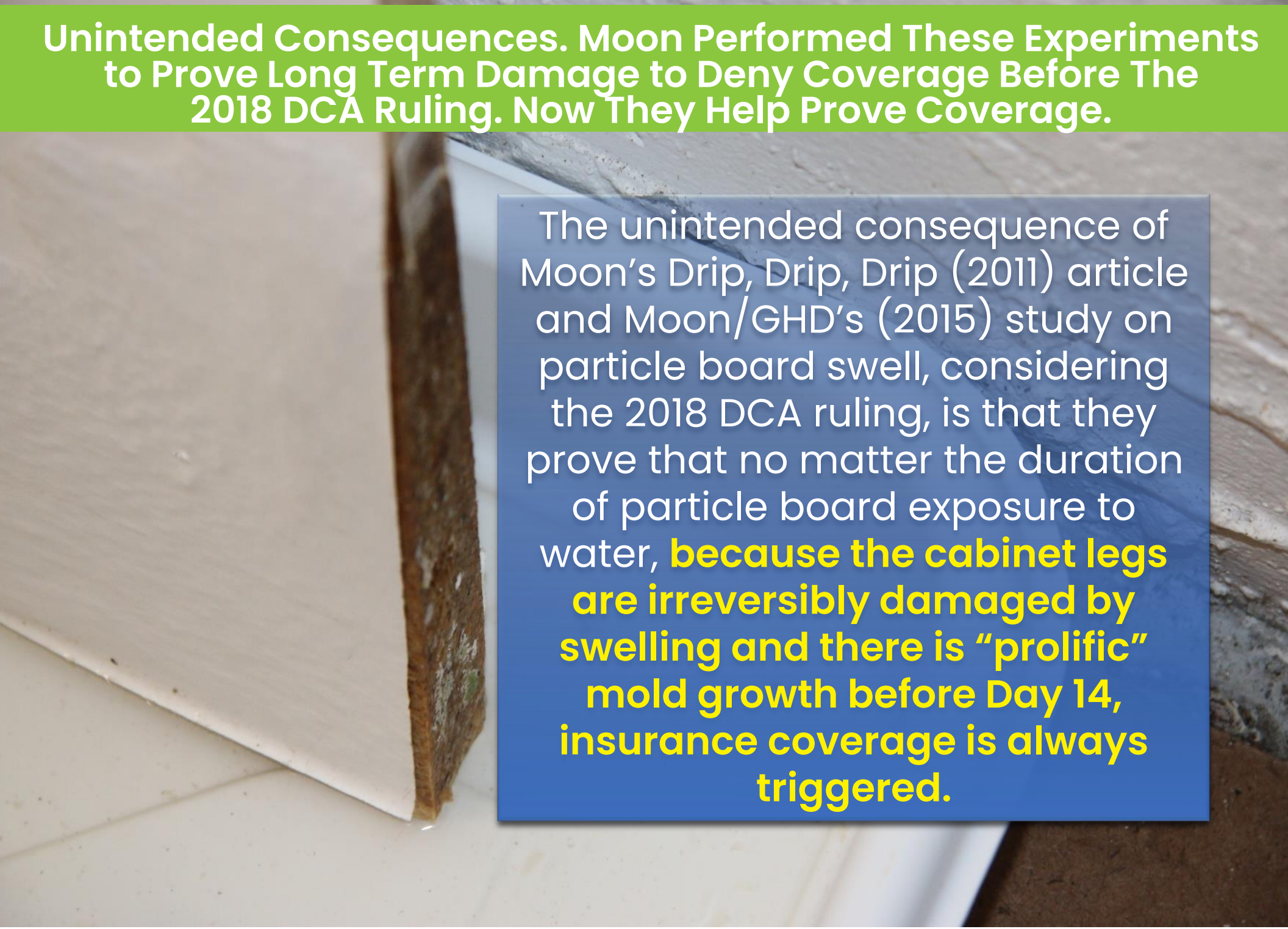
This Work is So Silly That It Should be Embarrassing

- If you look at Time = 0, the cabinets had a TS (Thickness Swell) of 9 centimeters BEFORE water exposure. Of course makes no sense.
- Please read Dr. Hindman's peer review of this Moon study in Appendix A.
- Hindman a world renowned composite wood specialist explains that while Moon claims the study is ASTM compliant it was not.
- Junk science is a nice term for Moon's work.

Equation that Moon says is 96% accurate.



Unintended Consequences. Moon Performed These Experiments to Prove Long Term Damage to Deny Coverage Before The 2018 DCA Ruling. Now They Help Prove Coverage.



The unintended consequence of Moon's Drip, Drip, Drip (2011) article and Moon/GHD's (2015) study on particle board swell, considering the 2018 DCA ruling, is that they prove that no matter the duration of particle board exposure to water, **because the cabinet legs are irreversibly damaged by swelling and there is "prolific" mold growth before Day 14, insurance coverage is always triggered.**

SEE APPENDIX a

SEE APPENDIX A FOR A PEER REVIEW OF MOON *" Thickness Swell in Particle Board"* BY PROFESSOR HINDMAN WORLD-RENOWNED SUBJECT MATTER EXPERT.

Mold Growth

04

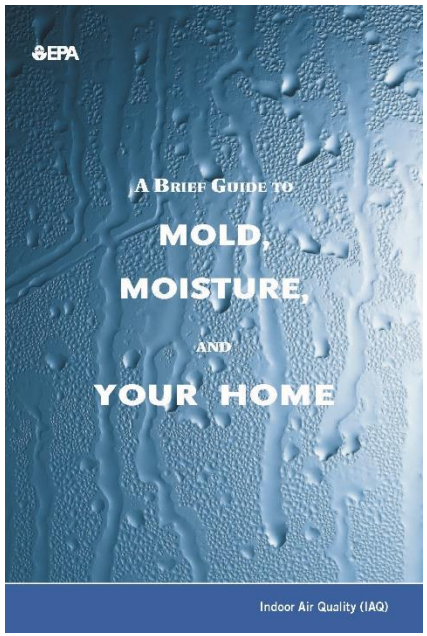
We review work by Dr. Moon that uses mold growth *exemplars* to deny coverage. We highlight findings from our earlier PowerPoint shown below.

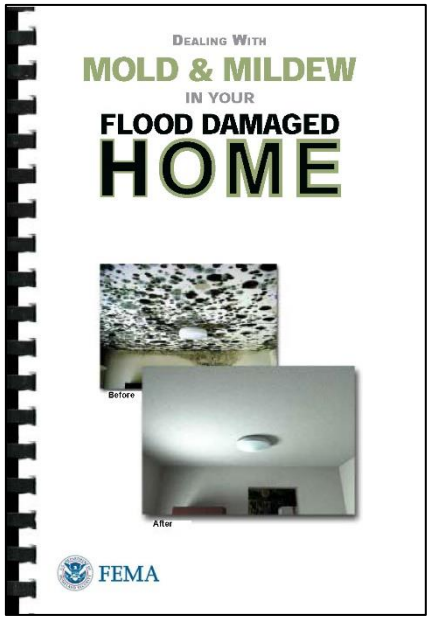
RALPH MOON CRITIQUES - OneDrive (live.com)

Mold Starts to Grow in 24-48 Hours.

- It is generally accepted [outside of the Insurance Industry] that mold will/can start to grow (germinate) quickly after a water event. Especially in hot, humid tropical South Florida.
- According to the US EPA: "It is important to dry water-damaged areas and items **within 24-48 hours to prevent mold growth**."
- Per FEMA mold growths, or colonies, can start to grow on a damp surface **within 24-48 hours after a water exposure.**

Moon/HSA: Federal Guidance Disregarded

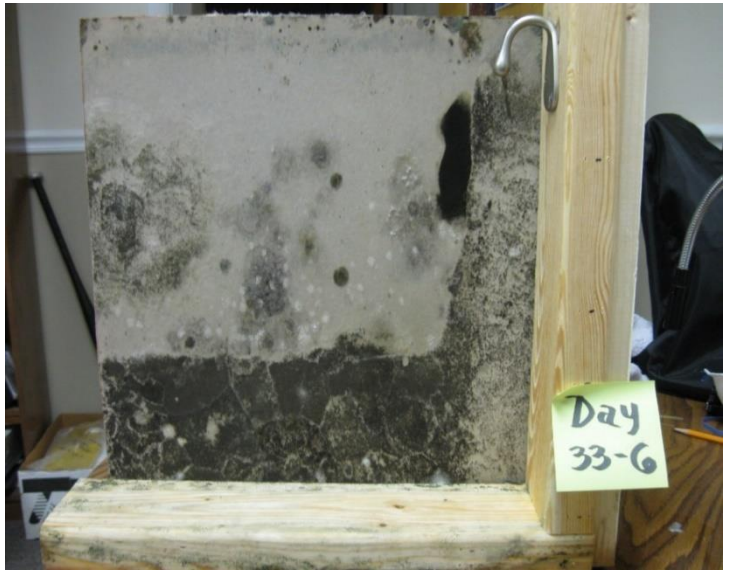




- In *Fighting Dr. Moon Denials Based on Mold Growth Profiles* we reviewed several, non peer reviewed, flawed insurance industry funded studies referenced by Moon…
- That have concluded (contrary to EPA & FEMA guidance) mold growth is slow — takes many weeks or months for mold to start to grow, therefore if mold is found deny coverage based on long term exclusion.
- On the contrary, Peer Reviewed studies published in scientific journals also reviewed in *Fighting Dr. Moon Denials Based on Mold Growth Profiles* show mold, even black colored Stachybotrys, grows fast (before 14 days) and because mold represents permanent damage that cannot be restored by drying, **finding mold always triggers coverage.**

Example of Moon Exemplars. No Published Source

- No published source for these Moon supplied pictures. They were used by Carrier defense to support claim denial.
- Pictures were "said to be" from the time of the Moon *Fungal Growth Succession on Gypsum Board Wall Assemblies* work (2011). What does that mean? Nothing. These are not admissible.
- They seem to be taken in a home or office (not a science lab). What are these pictures / exemplars of?
- Are these exemplars of a wall cavity? No.
- Why so different from one another given that both are dated Day 33? Impossible to know.
- Temperature, humidity, lighting? Unknown. Not science.
- Reproduced by others? No. Not science.



Ralph Moon, PhD.: Mold Grows FAST.

Fungal Growth and Sequence: Predictable fungal growth sequences were observed. Small, diffuse mats of mycelial growth were visible within two-three days of incubation. Visible growth first occurred on 50% of the wood sill plates where moisture was in direct contact with the assembly (Table 1). *Aspergillus* and *Trichoderma* structures were identified on Day 4 and 7 respectively. Immature *Chaetomium* ascomata and *Cladosporium* were observed on Day 14. Individual *Chaetomium* spores, *Alternaria and Pestaliopsis* were identified on Day 28. *Penicillium* was identified on Day 46; *Bipolaris* was identified on Day 50. *Curvularia* was identified on Day 53.

- Moon paper states mold grows fast — within a few days. Aspergillus by Day 4. That triggers coverage.
- Any mold growth triggers coverage. Moon points to other types of mold that he says grow slower and if he finds any of those after a water event, he recommends coverage denial due to long term damage.
- As we know, if there is permanent damage by Day 13 which requires remove and replace, additional "long term" damage has no affect on coverage. You already need to remove and replace by Day 14.

Per Moon study: Mold grows very fast. By Day 4. Always triggering coverage.

Fungal Growth Succession. Table 1 from Moon.

Table 1. First Appearance Sequence

Identification	Frequency *	Experimental Day									
		2	4	7	14	28	46	50	53	101	117
Mycelium	50%	X									
Aspergillus	50%		X								
Trichoderma	17%			X							
*Chaetomium**	34%				X						
Cladosporium	34%				X						
Chaetomium	83%					X					
Alternaria	17%					X					
Pestaliopsis	17%					X					
Penicillium	17%						X				
Bipolaris	17%							X			
Curvularia	50%								X		
Mites	50%										X

* Observed walls/total walls on first day of appearance

** Immature *Chaetomium* ascomota

- Chaetomium and Penicillium are both well known to occur within 1 week. This chart / this experiment makes no sense. It is in **Error.**
- See Peer-Reviewed scientific paper showing Chaetomium grows in 5 days. There are many other scientific studies that show both Penicillium and Chaetomium grow in less than 1 week.
- **See Peer Reviews of Moon "Fungal Growth Succession" in Appendix B as well as a short paper by Dr. Joe Spurgeon showing that the data in Moon Table 1 makes absolutely no sense.**

Moon Claiming Peer Review on His Resume

NV5

The previous interpretations were based on the following peer-reviewed publications:

- Davis, B., R. Moon and D. Rondy, 2012. Differences in Cabinet Damage Exposed to Water and Water with Detergent, American Society of Civil Engineers, IN 6th Forensic Engineering Congress Proceedings, October 31– November 3, 2012
- Davis B. and R. Moon, Thickness Swell in Particle Board: A Forensic Tool for Duration of Loss, American Society of Civil Engineering, 7th Forensic Congress, 2015
- Moon, R. 2012. Interpreting Continuous v Repeated Water Damage, American Society of Civil Engineers, IN Forensic Engineering Sixth Congress Proceedings, October 31– November 3, 2012
- Moon, R., M. Bass and C.J. Yang, Fungal Growth Succession on Gypsum Board Wall Assemblies, Indoor Air 2011 Conference Proceedings, Dallas Texas, June 10, 2011
- Moon, R., M. Bass and C.J. Yang, "Fungal Growth Sequence on Wall Assemblies", 2012, Indoor Air Quality Association Conference Proceedings, March 2012.
- Wells, N. C. Martinez, M. Bass and R. Moon, Metal Corrosion: A Qualitative Analysis, American Society of Civil Engineering, 7th Forensic Congress, 2015
- Wells, N. and R. Moon, Duration of Metal Corrosion: Plumbing and Construction Materials, American Society of Civil Engineering, 8th Forensic Engineering Congress, November 29-December 2, 2018

- Moon on his resume at NV5 claims these two oral presentations at 2010 and 2011 Conferences are published and Peer-Reviewed.

But they do not exist. They are nowhere to be found. They are not published. They are inventions.

Never Published. But Moon Claims Published and Peer Reviewed.

Fungal Growth Succession on Gypsum Board Wall Assemblies

Ralph E. Moon, Ph.D. [1], Michael Bass[1], Chin S. Yang, Ph.D.[2]

[1] HSA Engineers & Scientists, Tampa, Florida
[2] Prestige EnviroMicrobiology, Voorhees, New Jersey

*Corresponding email: rmoon@hsa-env.com; mbass@hsa-env.com;
chins.yang@prestige-em.com

SUMMARY

A 4-month (117 days) test simulated conditions favorable for fungal growth on 6 finished wall assemblies exposed to continuous moisture. Visible growth first occurred on the wood sill plates where moisture was in direct contact with the assembly. *Aspergillus* and *Trichoderma* structures were identified on Days 4 and 7 respectively (Table 1).

KEYWORDS

Gypsum wallboard, fungal succession, duration of loss, continuous, repeated water exposure

There is no date.

There is no indicia that would indicate that this is a reprint from an actual journal.

Just something Moon typed up and claimed published, peer reviewed?

Never Published Nonsense.

RESULTS

Moisture Content, Temperature and Relative Humidity: Moisture content was 35% at a measured height of 4 inches above the floor in all walls for the entire test period. Moisture successively decreased between 4 inches and the top (18 inches) where the gypsum board contained between 15 to 19% moisture. The interior temperature was held near 76°F while the relative humidity oscillated between 70 and 95% depending on the watering schedule.

Fungal Growth and Sequence: Predictable fungal growth sequences were observed. Small, diffuse mats of mycelial growth were visible within two-three days of incubation. Visible growth first occurred on 50% of the wood sill plates where moisture was in direct contact with the assembly (Table 1). *Aspergillus* and *Trichoderma* structures were identified on Day 4 and 7 respectively. Immature *Chaetomium* ascomata and *Cladosporium* were observed on Day 14. Individual *Chaetomium* spores, *Alternaria and Pestaliopsis* were identified on Day 28. *Penicillium* was identified on Day 46; *Bipolaris* was identified on Day 50. *Curvularia* was identified on Day 53.

"Relative humidity oscillated between 70 and 95%." How can this experiment be repeated? Impossible.

"Predictable fungal growth sequences were observed."

See Appendix B showing that the fungal growth sequences found by Moon are not at all what anyone in the industry finds. Results make zero sense.

Just made up, never repeated non-sense.

What Mold Studies Does Moon Refer To That Refutes EPA/FEMA That Mold Grows FAST? Not His Own!

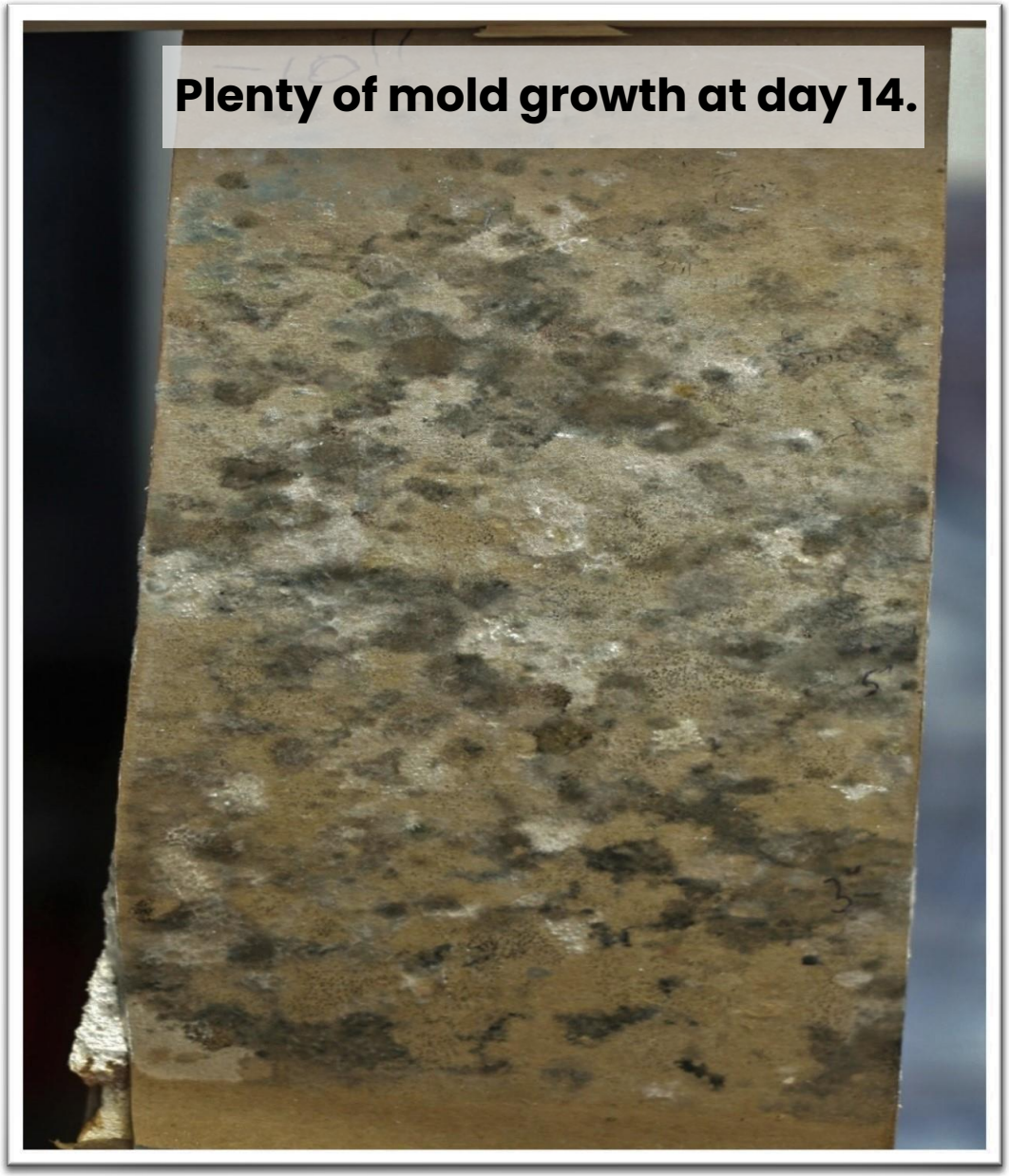
As we have shown in *Fighting Dr. Moon Denials Based on Mold Growth Profiles* severely flawed, non-published, studies by engineering firms working for insurance Carriers claim that mold takes 3 weeks or longer to grow. These are commonly referenced by Dr. Moon and his followers when denying claims based on mold growth.

Why severely flawed? They use pristine / clean water; work done in clean lab rooms; work done in Pacific Northwest; etc. Not performed under hot, humid, moldy Florida conditions. Not reproduced by others. Never published.

We've performed our own studies (under South Florida conditions hot/humid conditions) that confirm EPA/FEMA: Mold grows fast.

Moon never refers to his 2010 Fungal Growth Sequences where he also finds mold grows within a few days after a water event.

Our Experiment. At 14 Days Heavy Mold. Many Genus/Species. For More Details See: *Fighting Dr. Moon Denials Based on Mold Growth Profiles*



Cost of Repair After Day 13

- Given that mold will always grow on wet drywall before Day 14 in a real-world Florida environment and trigger coverage, what is the incremental cost to repair the damages at any time after 13 days?
  - 1 day later?
  - 1 week?
  - 1 month later? Or.
  - 1 year later?
- Any cost difference?

Cost of Repair After Day 13

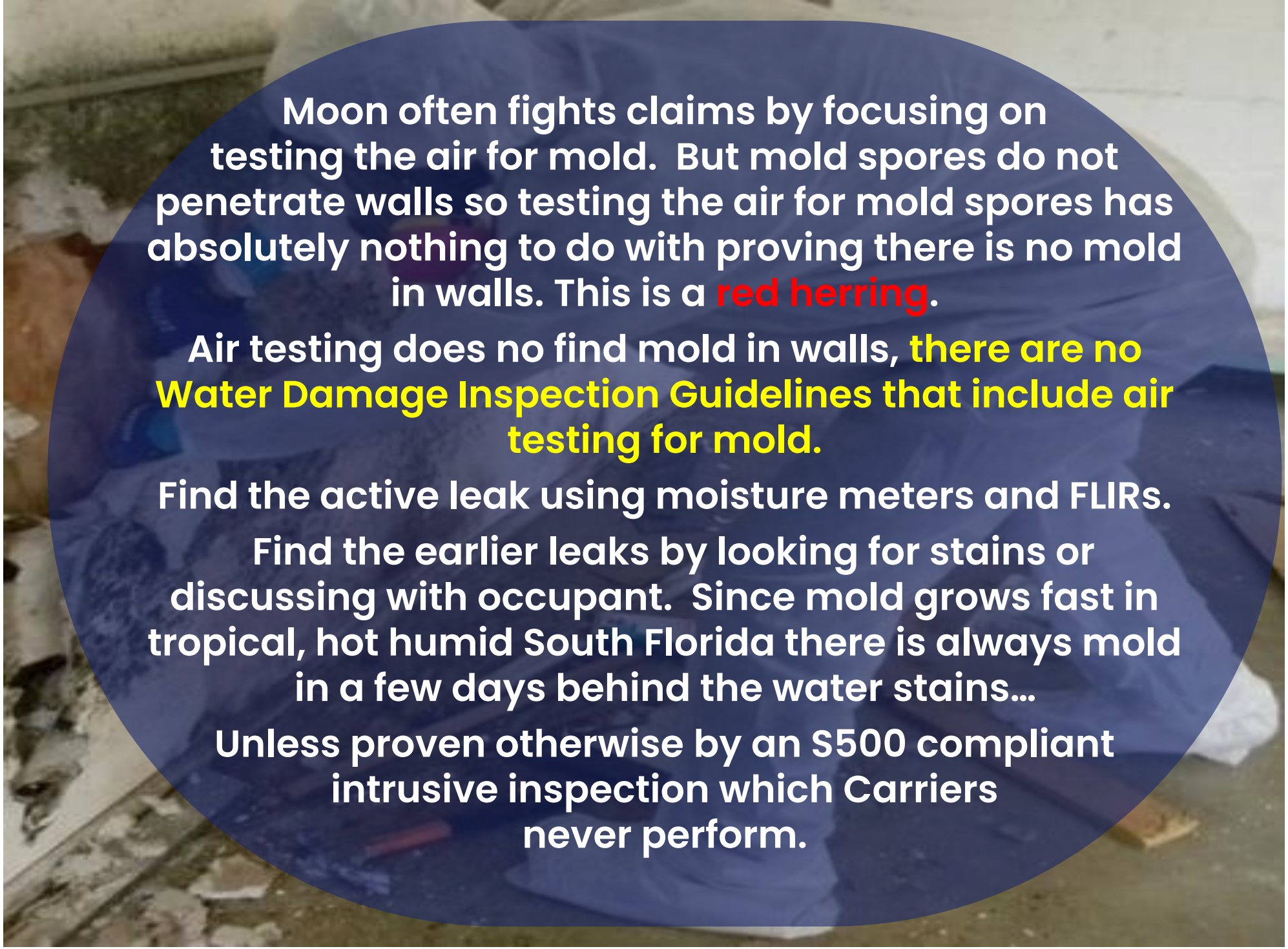
Based on our experience as a State Licensed Building Contractor and State Licensed Mold Remediator that has performed over 2000 mold remediation/water damage remove and rebuild jobs …

Given that the cost of drywall is about 40 cents / sq ft, the answer is removal and replacement of additional drywall due to mold growth after Day 13 has **NO impact on the cost of mold remediation/ rebuild.**

Cost of Repair After Day 13

XACTIMATE®

- The cost of remediating mold on drywall and drywall rebuild does not change if there is 1-2 inches of mold or 1-2 feet of mold.
- The line item in Xactimate is based on drywall removal + replacement per linear feet up to 24 inches high.
- 2 inches high or 24 inches high …NO CHANGE IN COST TO REMEDIATE + REPLACE PER XACTIMATE!
- So whether the mold growth was 13 days or two months … the same cost to remediate/rebuild!



Moon often fights claims by focusing on testing the air for mold. But mold spores do not penetrate walls so testing the air for mold spores has absolutely nothing to do with proving there is no mold in walls. This is a red herring.

Air testing does no find mold in walls, there are no Water Damage Inspection Guidelines that include air testing for mold.

Find the active leak using moisture meters and FLIRs.

Find the earlier leaks by looking for stains or discussing with occupant. Since mold grows fast in tropical, hot humid South Florida there is always mold in a few days behind the water stains…

Unless proven otherwise by an S500 compliant intrusive inspection which Carriers never perform.

SECTION SUMMARY: MOLD GROWS FAST

Mold growth is permanent damage that triggers coverage. Mold grows fast. There is always hidden mold in walls after a water event whether dried out or not before Day 14 unless proven otherwise by the Carrier performing an IICRC S500 defined intrusive inspection. They never do.

There are no water damage standards or references that involve air sampling to find hidden mold.

Carriers never perform inspections as defined by ANSI-IICRC S500 or ANSI-IICRC S520.

Moon's pictures of mold (he calls Exemplars) are not sourced and not published and should not be relied upon to opine on the timing of damage — should not be admissible.

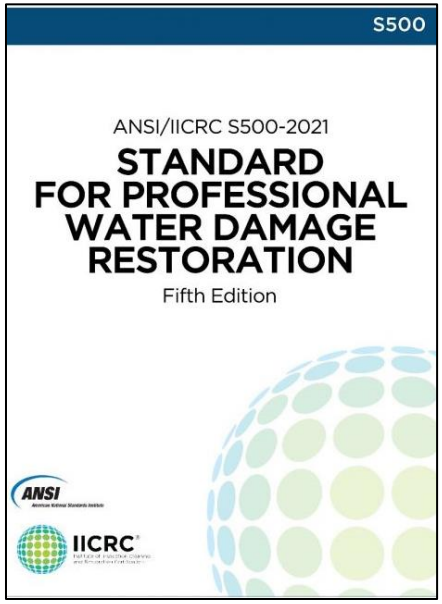
ATTORNEYS: IMPORTANT TO EXPLAIN BY POINTING OUT INDUSTRY REFERENCES THAT MOLD GROWS FAST & AIR SAMPLING IS NOT PART OF A WATER DAMAGE ASSESSMENT.

ANSI/IICRC S500 Defined "Initial Inspection"

1.2.2.1 Initial Inspection

Restorers should inspect and document the source and time of the water intrusion, visible material deterioration, pre-existing damage and visible microbial growth.

Professional moisture detection equipment should be used to inspect and document the extent of water migration and moisture intrusion into building materials and contents.



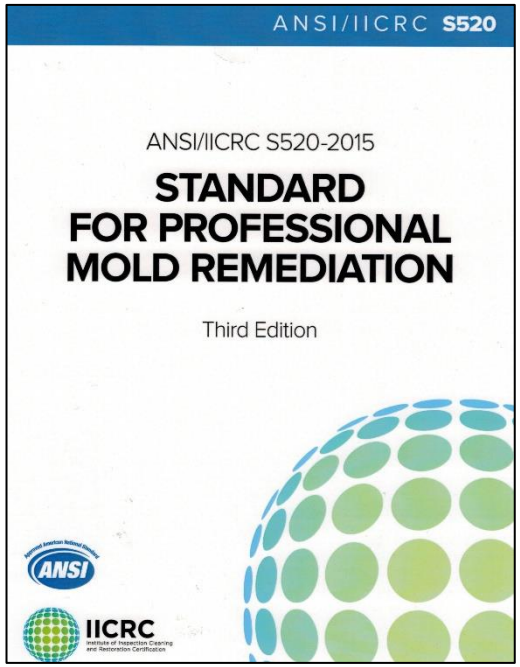
The ANSI-Approved IICRC S500 water damage inspection is visual.
No mention of air testing. Keep in mind that indoor air testing does not detect mold inside of walls or behind cabinets.
That is why air testing for mold is not part of an ANSI/IICRC S500 compliant water damage inspection.

ANSI/IICRC S520 Defined "Building Inspection"

10.4 Building Inspection

A physical site inspection or a walk-through of affected premises should be performed in order to gather information about the condition of a property that can lead to a preliminary determination about the presence of moisture and mold.

The building inspection can include but is not limited to looking for: water intrusion or condensation, water stains, structural damage, HVAC operation, odors, construction type, previous repairs or remodeling, and structure defects.

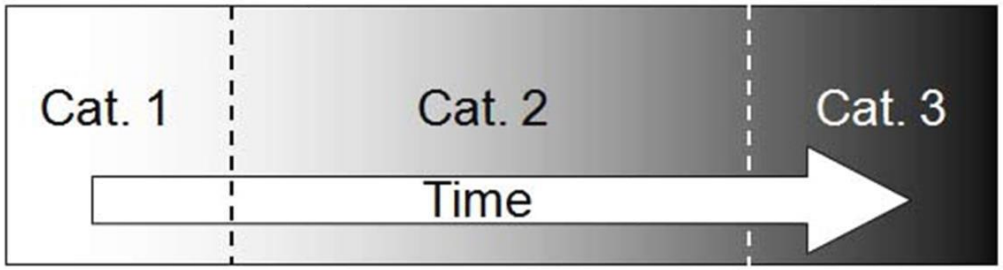


As with ANSI-Approved IICRC S500, the ANSI-Approved S520 **Building Inspections** is visual.

No mention of air testing. Air testing is not in any way involved in finding hidden mold.

Per IICRC: Time and Temperature Affect Change in Category

Time and temperature affect water contamination levels significantly and can result in a change to a higher Category



An untreated Category 1 loss may be reclassified as a Category 2 in 48 to 72 hours
(moderate Levels of Fungi and Bacteria)
reclassified again to Category 3 in 6-7 days
(high Levels fo Fungi and Bacteria)

Per IICRC Chart: Change from Category 1 (Clean water) to Cat 2 (Moderate Levels of Fungi and Bacteria) in 48-72 hours.

CONSISTANT WITH ADVICE FROM EPA/FEMA AND DR. RALPH MOON.

Dr. Ralph Moon (Carrier Defense Expert)

Fungal Growth Succession on Gypsum Board Wall Assemblies

Ralph E. Moon, Ph.D. [1], Michael Bass[1], Chin S. Yang, Ph.D.[2]

[1] HSA Engineers & Scientists, Tampa, Florida
[2] Prestige EnviroMicrobiology, Voorhees, New Jersey

*Corresponding email: rmoon@hsa-env.com; mbass@hsa-env.com;
chins.yang@prestige-em.com

Study on the rate of mold growth by Dr. Moon back in 2010. This old reference is not a reference he wants us to see. Why? He shows mold starts to grow in only a few days. Always triggering coverage.

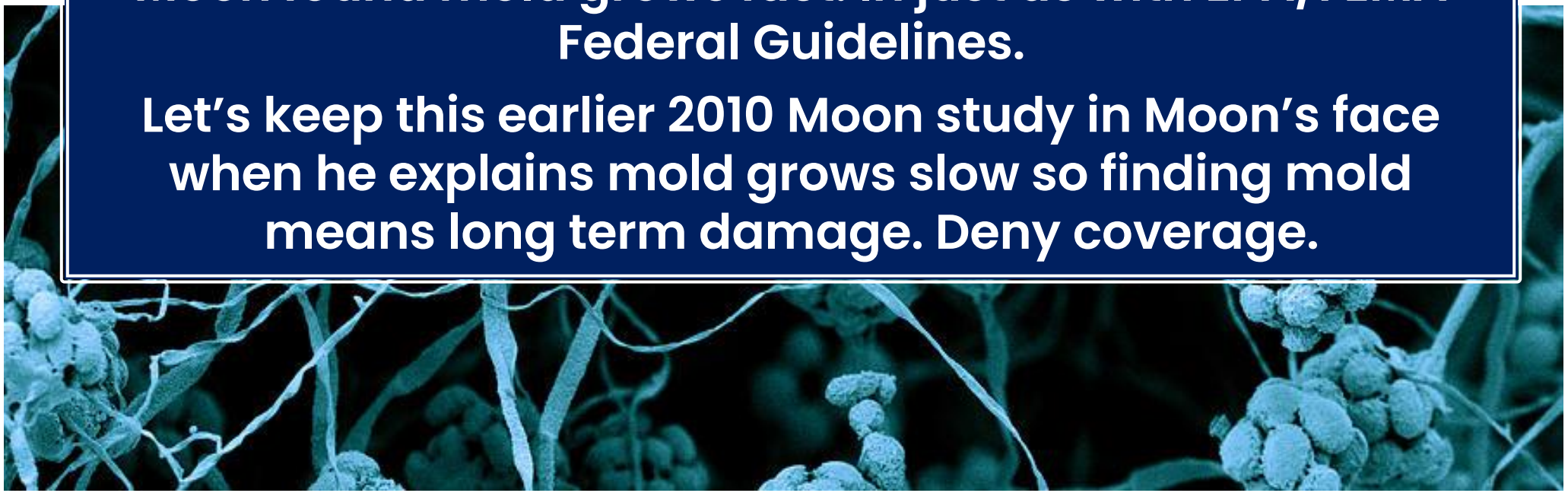
Moon: "Mold Grows Fast" Within a Few Days

Fungal Growth and Sequence: Predictable fungal growth sequences were observed. Small, diffuse mats of mycelial growth were visible within two-three days of incubation. Visible growth first occurred on 50% of the wood sill plates where moisture was in direct contact with the assembly (Table 1). *Aspergillus* and *Trichoderma* structures were identified on Day 4 and 7

Per Moon: Mold grows fast within a few days. There is always hidden mold as a result of a leak/flood no matter if dried or not.

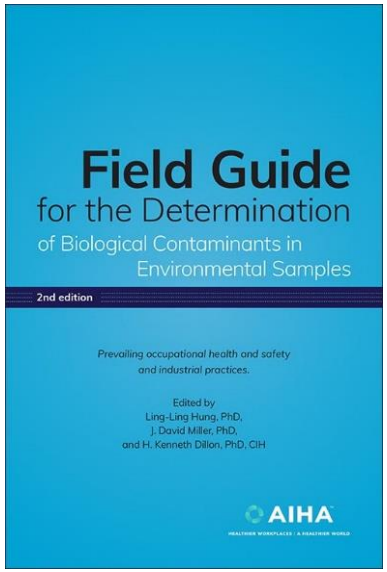
Moon found mold grows fast. In just as with EPA/FEMA Federal Guidelines.

Let's keep this earlier 2010 Moon study in Moon's face when he explains mold grows slow so finding mold means long term damage. Deny coverage.



AIHA Field Guide: Moon's Favorite Mold Reference

"… growth and germination of a spore, which is microscopic, may form a visible colony on building substrates within 24 to 48 hours." (Page 33)



- Moon focuses on air sampling in lieu of actual Industry Compliant water damage inspections.
- Moon is not a hygienist but Moon loves to reference AIHA (American Industrial Hygiene Association) Field Guide because hygienists are focused on mold exposure (breathing mold) and AIHA Field Guide therefore emphasizes air sampling to measure mold exposure.
- (It is not a guideline for assessing water damage.)

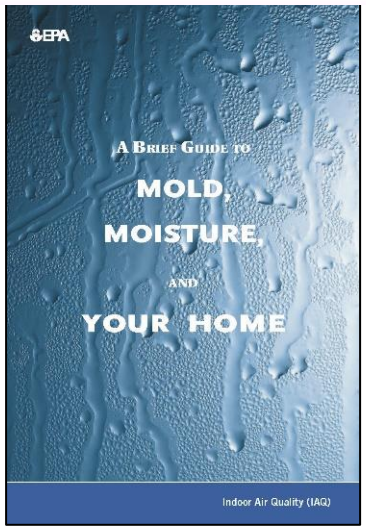
But KEEP IN MIND, Field Guide (Moon's favorite Reference) states: Mold grows fast "within 24-48 hours".

Let's keep this AIHA fast growth reference in Moon's face when he explains mold grows slow so finding mold means long term damage. Deny coverage.

Mold Grows FAST.
EPA On Mold and Water Damage (Page 4)

MOLD BASICS

- The key to mold control is moisture control.
- If mold is a problem in your home, you should clean up the mold promptly *and* fix the water problem.
- It is important to dry water-damaged areas and items within 24-48 hours to prevent mold growth.



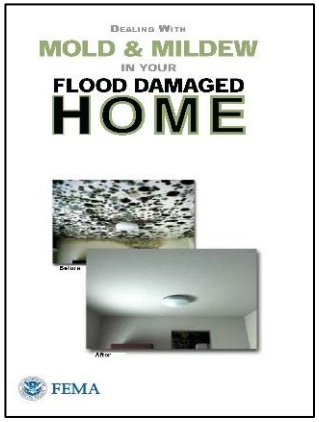
Mold Grows FAST. FEMA (Page 15)

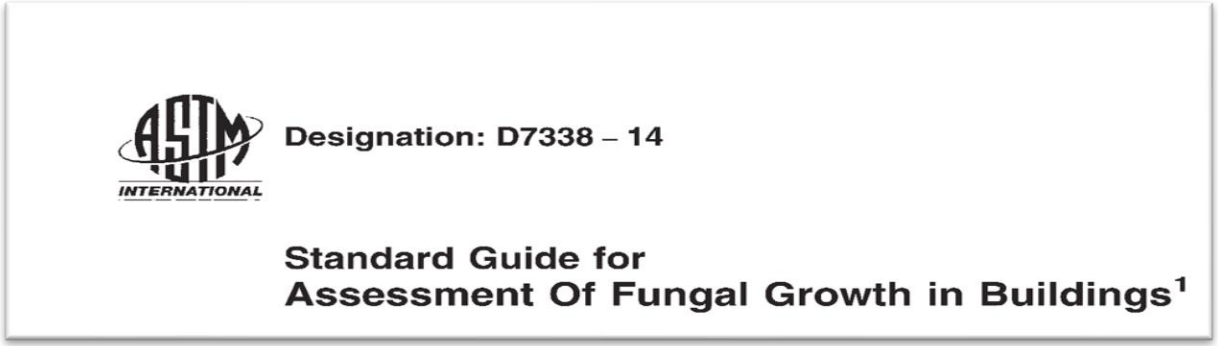
Mold in Your Home?

If your home has **water damage** due to -

- flooding,
- sewage back-up from flooding in the area,
- plumbing or roof leaks,
- damp basement or crawl space,
- overflows from sinks or bathtub, or
- high humidity: steam cooking, dryer vents, humidifiers,

mildew and mold will develop within 24-48 hours of water exposure.
Even worse, it will continue to grow until steps are taken to eliminate the source of moisture, and effectively deal with the mold problem.





Designation: D7338 – 14

Standard Guide for
Assessment Of Fungal Growth in Buildings[1]

7. Basic Fungal Growth Assessment

7.1 The most important requirement of an assessment for fungal growth is an on-site inspection of the subject building or portion of the building as per the scope of work…

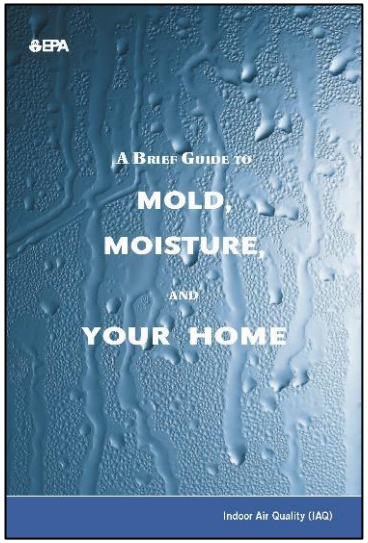
Parts of an assessment may include:

- **the collection of background information,**
- **the formulation of a hypothesis or hypotheses,**
- **an on-site inspection including moisture dynamics,**
- **an evaluation of the HVAC system,**
- **hypothesis testing, site documentation, and written report.**

ASTM: No mention of air testing. Visual inspection only. Moon claims his studies such as Fungal Growth Sequence are ASTM compliant. But ASTM Basic Fungal Growth Assessment does not involve testing. His claim makes no sense.

EPA On Mold Testing (Page 15)

Testing or sampling for mold Is sampling for mold needed? **In most cases, if visible mold growth is present, sampling is unnecessary.**



Keep in mind that indoor air testing does not detect mold inside of walls or behind cabinets. That is why air testing for mold is not part of an IICRC S500 or S520, EPA, FEMA, or ASTM water damage inspection.

What Do We Need to Know About Mold and Water Damage Claims

- Mold is excluded from property insurance policies.
- Mold only as a result of a sudden leak is covered.
- Mold grows fast in tropical, hot and humid South Florida and there is always mold hidden in walls or behind cabinets after a leak (whether dried out or not.)
- Air testing for mold spores is of no value in regard to finding mold in walls. Spores cannot penetrate walls.
- Air testing for mold spores is not part of any of the 5 commonly referenced mold and water damage standards (S500, S520, EPA, FEMA, ASTM D-7338).

For water damage inspections/assessments we focus on finding current or prior leaks. Not air testing to find hidden mold.

For water damage inspections/assessments we explain that mold grows in a matter of days and there is always mold.

Unless the Carrier performs an intrusive inspection after a leak to prove otherwise, there is always mold that triggers coverage.

Because Carriers never perform such inspections, they have invented and rely upon Exemplars in lieu of S500 Compliant Inspections.

SEE APPENDIX B

SEE APPENDIX B FOR PEER REVIEWS OF MOON "FUNGAL GROWTH SUCCESSION" and MOON EXEMPLARS BY SEVERAL WORLD-RENOWNED SUBJECT MATTER EXPERTS.

Carpet Tack 05

We review Moon/HSA (2013) study on carpet tack showing fast mold growth contradicting current Moon position that mold grows slow.

Dr. Moon & HSA: Capet Tack Studies

Carpet Tack Strips: Determining the Duration of a Water Loss

Donald E. Nehrig, CIAQP, EI, CIEC and Ralph E. Moon, Ph.D.
HAS* Engineers & Scientists, 4019 East Fowler Avenue, Tampa, Florida 33617

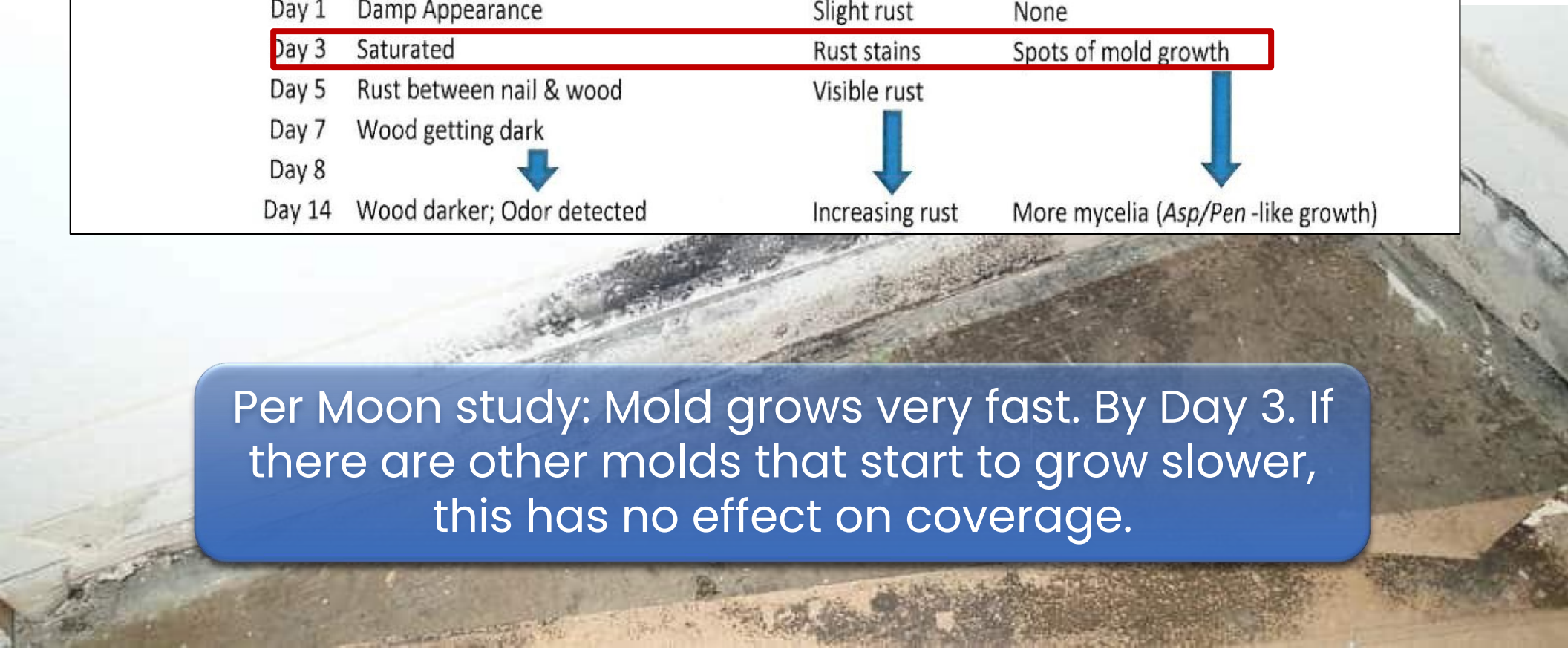
HSA*: Insurance defense forensic engineering firm. Article misspells the name of the company. It should be HSA and not HAS.

Spots of Mold Growth by Day 3 Table 1. Continuous Moisture.

FORENSIC ENGINEERING 2012 © ASCE 2013 618

Table 1. Continuous Moisture Exposure

Duration	Wood[1]	Nails	Microbial Growth
Day 1	Damp Appearance	Slight rust	None
Day 3	Saturated	Rust stains	Spots of mold growth
Day 5	Rust between nail & wood	Visible rust	
Day 7	Wood getting dark		
Day 8			
Day 14	Wood darker; Odor detected	Increasing rust	More mycelia (*Asp/Pen* -like growth)



Per Moon study: Mold grows very fast. By Day 3. If there are other molds that start to grow slower, this has no effect on coverage.

Spots of Mold Growth by Day 3 Table 2. Cyclical Moisture.

Table 2. Cyclical Moisture Exposure - 7 Days Wet/ 7 Days Dry[1]

Duration	Wet-Dry Cycle Wood[2]	Nails	Microbial Growth
Day 1	Damp Appearance	Slight rust	None
Day 3	Saturated	Rust stains	Spots of mold growth
Day 5	Rust between nails & wood	Visible rust	Visible surface growth (*Asp/Pe* n-like)
Day 7	Wood getting dark		*Asp/Pen* -like and mycelia dominate
Day 8	Wood getting lighter		
Day 14	Wood getting lighter		

Per Moon study: Mold grows very fast. By Day 3.

Just as in Moon's Fungal Growth Sequence where he finds mold starts to grow in a few days.

But just as with Moon's Fungal Growth Sequence, Moon tries to bury the finding of fast mold growth in this earlier (2012) study. Let's keep this in his face.

Wrap Up

06

Exemplars are being misused by insurance Carrier defense "experts" to wrongly deny valid claims. We should now know how to fight wrongful denials

Challenge Moon/GHD/HSA Exemplars

- None of the Moon/GHD/HSA work has been peer reviewed by independent, external experts or published in legitimate scientific journals.
- Scientific journals are never going to publish work performed by companies that are paid by insurance Carriers (non-disclosed conflict of interest.)
- Challenge the basis for the denial … comparison to Moon's so-called exemplars. GHD/HSA made for hire reports do not in any way meet requirements under Daubert. They are not admissible and should be challenged.
- Challenge Moon/GHD/HSA exemplars as they are not from models that reflect actual Florida buildings or Florida weather.

And there is no known source for the pictures they use as mold exemplars.

Dr. Rene Salazar on Moon's So-Called Peer Reviewed Papers

- In an earlier (4/2015) deposition, Dr. Rene Salazar (Appendix C for his C.V.) was asked about Moon's statements that Moon's studies (performed in Moon's office) and "published" in *Forensic Engineering Proceedings* were actually peer reviewed as Moon claims. Professor Salazar does an excellent job explaining and we quote his words here:
  - *"Proceedings are not peer reviewed. Again, I think Dr. Moon is confusing the definition of peer review. Peer review -- you know, having a Proceedings officer or a group or committee decide whether the paper is worthy of being included in the proceedings of a conference, that is not peer review."*
  - *"Passing it around the office or -- and I don't mean -- I'm not being critical of that. I'm just saying that passing it to your peers before you send it off to an editor of a publication is not peer reviewed."*
  - *"Regarding Conference Proceedings: " I think these are proceedings. I'm not -- I don't know the answer to that, but if these are proceedings, this is not a peer reviewed process. Yes, a group of people get together and decide whether Moon is going to be able to present at the conference, and if he presents, his paper automatically gets into the Proceedings, but presenting at a conference is not a peer reviewed process. It's just allowing somebody to come in who might have a novel idea that the conference organizers decide, you know, let's -- let's -- let him discuss this in front of everybody, but it does not mean that it is a peer reviewed process or an article or that the article has any credibility. It's just allowing him to present it at the conference . "*

Challenge Moon GHD/HSA Use Of Exemplars to Determine Timing of a Water Event Instead of Performing an ANSI/IICRC (Mandatory) Water Damage Inspection

- Caution: Because proper (industry-compliant water damage) inspections are not performed by Carriers, their so-called experts are forced to rely on pictures that come from unknown sources, and not in any way comparable conditions, to attempt to prove long term duration of water leak. Deny coverage. A Red Herring.
- Why a Red Herring? The duration of the water leak/release/event is not relevant to coverage. Only the timing of the damage is.
- And because mold grows fast and cabinets warp, swell, delaminate fast, when water touches drywall or cabinet feet, coverage is always triggered unless proven otherwise by a Carriers S500 compliant intrusive inspection.

Document Damage Inside Walls Important

Fungal Growth Succession on Gypsum Board Wall Assemblies

Ralph E. Moon, Ph.D. [1], Michael Bass[1], Chin S. Yang, Ph.D.[2]

[1] HSA Engineers & Scientists, Tampa, Florida
[2] Prestige EnviroMicrobiology, Voorhees, New Jersey

"The next lowest diversity was the painted front of the gypsum board and side face of the wall assembly (both 1.0 average taxa), and the painted horizontal base trim (1.1 average taxa). **Low diversity was attributed to chemical inhibitors in the paint** and low moisture content (vertical stud).

According to Moon: Painted drywall (drywall surface) has a mold inhibitor in it. That's why you must always look inside of unpainted walls as required by ANSI-IICRC S500 1.2.2.1 Initial Inspection. Carriers never do.

Inspect In Both Water Exposed and Non-Water Exposed Areas

The ANSI-Approved IICRC S500 compliant inspection must be inside walls in both the water exposed as well as non-water exposed areas.

Document the mold with quality photographs using high quality professional lighting. Pictures are worth a 1000 words. Document any moisture visually with a FLIR.

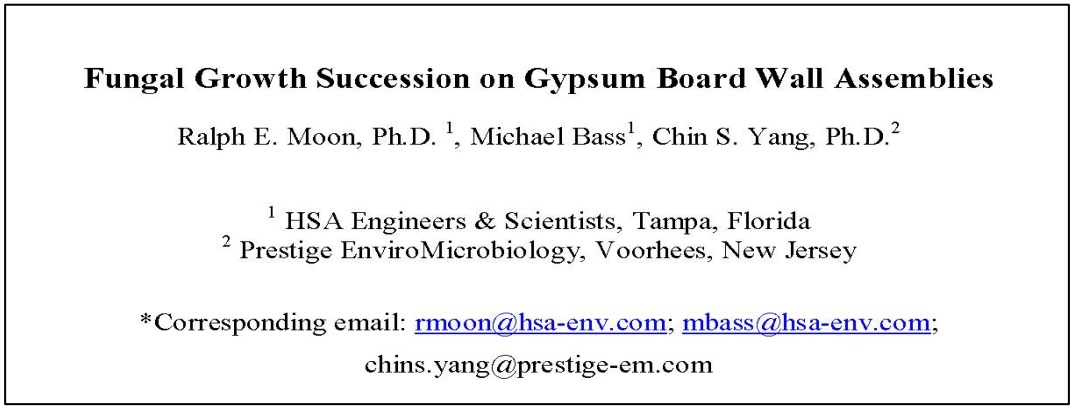
Do not rely on any single factor such as characterizing / analyzing mold. **Look at all factors (rust, mold, wood rot, staining, particle board swell, location and extent of wet areas) as explained in "Anatomy" PowerPoint.**

By performing an ANSI/IICRC S500 compliant intrusive inspection, you will always have the edge over the superficial (non-IICRC compliant) non-intrusive Carrier inspection and their reliance on Exemplars.

Be Cautioned About Mold Growth Pictures In Lieu of Actual On-Site Mold Analysis/Testing

Regarding pictures of mold growth provided by defense experts as "exemplars" to compare to mold growth pictures from an insured's home:

- Where do the defense expert's pictures of mold growth come from?
- There are no pictures of mold growth in the Moon/HSA 2010 presentation on mold growth succession.
- There are absolutely no pictures of mold in ANY of Moon's referenced publications.
- What are the lighting conditions? Comparable temperature and humidity? No one knows. Moon's exemplars are certainly not exemplars (perfect replicas) of real houses.
- But that is actually not the major issue. These pictures have no known source. They cannot survive a Daubert Challenge.



Fungal Growth Succession on Gypsum Board Wall Assemblies

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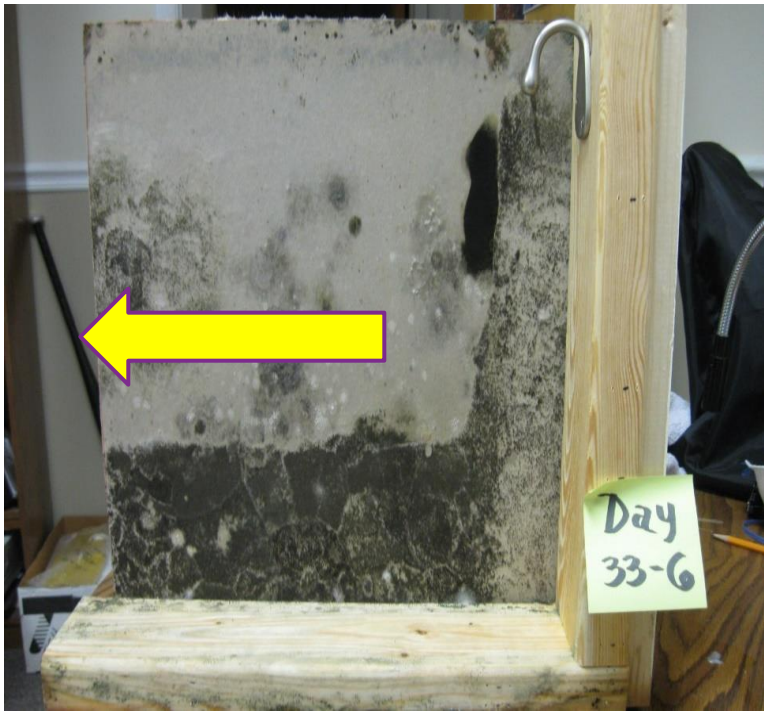
[2] Prestige EnviroMicrobiology, Voorhees, New Jersey

*Corresponding email: rmoon@hsa-env.com; mbass@hsa-env.com;
chins.yang@prestige-em.com

Be Cautioned About Mold Growth Pictures In Lieu of Actual On-Site Mold Analysis/Testing

- There are no published, accepted procedures by ASTM or other, that the color of mold (either at the time of loss, or months or years later) can be used to reliably determine the timing of a water exposure/ event.



- The Moon mold pictures (exemplars) appear to come from studies that were performed in his home or office. See baseball bat.
- Never published nor Peer Reviewed by Independent, External, Subject Matter Experts.
- No one actually knows what these pictures are and where they come from. Challenge them.

Per Ralph Moon: Mold Grows FAST.

Fungal Growth and Sequence: Predictable fungal growth sequences were observed. Small, diffuse mats of mycelial growth were visible within two-three days of incubation. Visible growth first occurred on 50% of the wood sill plates where moisture was in direct contact with the assembly (Table 1). *Aspergillus* and *Trichoderma* structures were identified on Day 4 and 7

- Moon paper states mold grows fast — within a few days. Aspergillus by Day 4. **Thank you Dr. Moon.**
- Mold growth (any mold growth) at Day 4 represents near term (<14 days) permanent damage and triggers coverage.
- Moon somehow refers to this presentation as proof that mold grows slow.
- How does he do this? He says it is peer-reviewed. And the defense attorney asks if your critique or comment is peer reviewed, if not, then he shuts you down.
- Dr. Salazar a well subject matter known expert concludes: Not Peer-Reviewed as defined by the scientific community.

See Peer Reviews of Moon Fungal Growth by 2 other well known experts in Appendix B.

See Salazar's Resume in Appendix C.

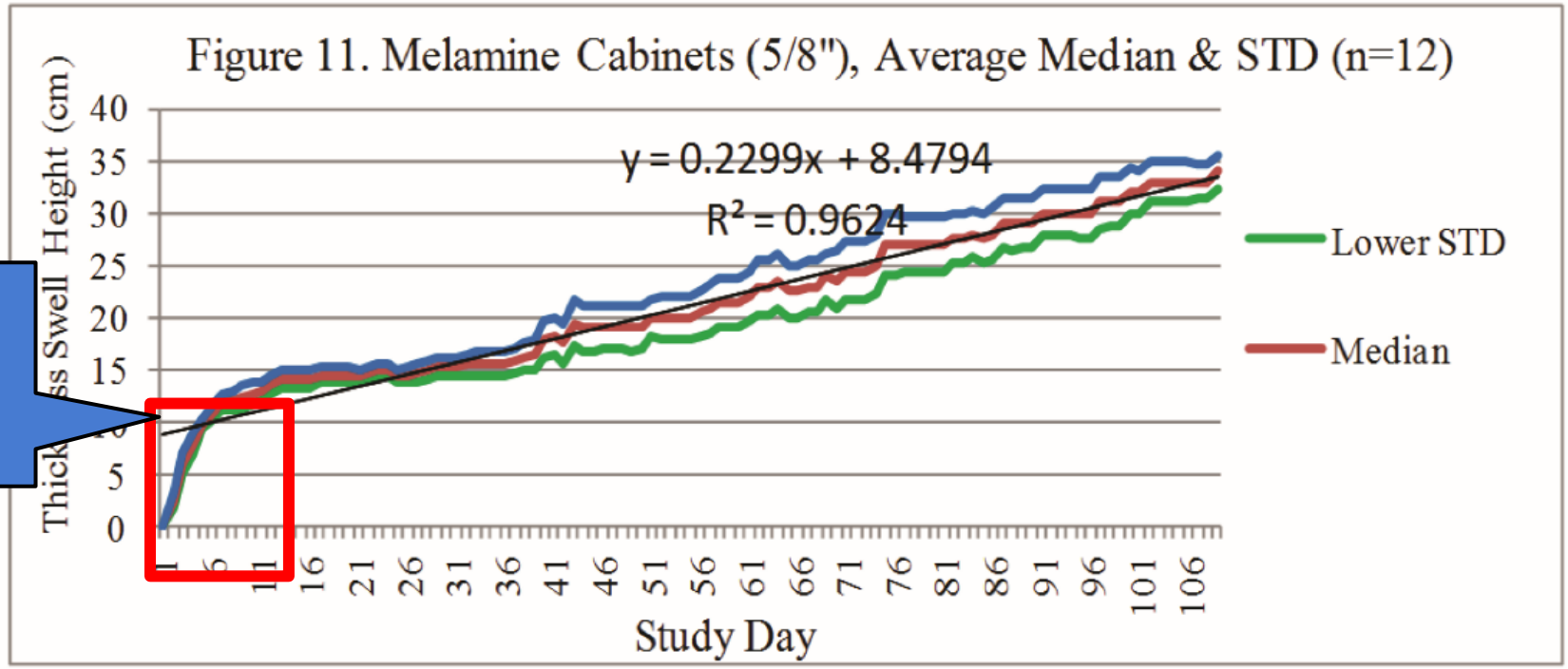
Be Cautioned About Mold Growth Pictures

- All pictures of mold growth taken by adjusters using phones or cheap cameras without professional lighting will look dark and long term compared to pictures of mold taken with proper /quality lighting.
- See pictures below: The same picture under different light sources. Clearly the left picture is overly dark which was used to claim heavy long-term mold growth … to deny claim.

Original

Same pix after adjusting the light so that the Two by Fours are the correct color.

Per Ralph Moon: Cabinet Damage is FAST.



Permanent Damage by Day 14

- The Moon/GHD 2015 cabinet damage study shows, over and over, always a massive swelling spike (permanent damage) before day 14 that triggers coverage. **Thank you Dr. Moon.**
- Additional damage after Day 13, has no impact on coverage.

This is What a Real Journal Reprint Looks Like

THE JOURNAL OF BIOLOGICAL CHEMISTRY
Vol. 254, No. 21, Issue of November 10, pp. 10654-10661, 1979
Printed in U.S.A.

Assessment of Total Catalytic Sites and the Nature of Bound Nucleotide Participation in Photophosphorylation*

(Received for publication, April 30, 1979)

Gary Rosen, Michael Gresser,‡ Chana Vinkler, and Paul D. Boyer

From the Molecular Biology Institute and the Department of Chemistry, University of California, Los Angeles, California 90024

Fungal Growth Succession on Gypsum Board Wall Assemblies

Ralph E. Moon, Ph.D. [1], Michael Bass[1], Chin S. Yang, Ph.D.[2]

[1] HSA Engineers & Scientists, Tampa, Florida
[2] Prestige EnviroMicrobiology, Voorhees, New Jersey

Top: This is what a real published article reprint looks like:

- Journal Indicia: Journal Name; Volume; Date; Typeset and not hand typed (home made) by Ralph Moon.
- Available to the public by searching the Journal Records.
- Not produced by a for hire Insurance Defense Engineering firm.

Moon "Fungal Growth Succession" is not real. Just something Moon typed up. Ask Moon to prove otherwise.

Moon's Current Employer NV5 "Worst Case" Conditions

FORENSIC RESEARCH & TESTING PROGRAM (NV5 Web Site 4-16-22)

"Many water losses are the result of long-term, low volume releases. However, in our test program, we exposed wood and metal exemplars to both continuous and repeated sources of moisture to create the "worst case" conditions for comparison to the damaged materials in the claim. This approach simulated the shortest period of time necessary to cause observed damage."

Test programs under "worst case" conditions to "simulate the shortest period of time" to cause water damage. Moon repeats this statement during testimony under oath. Ask Moon specifically:

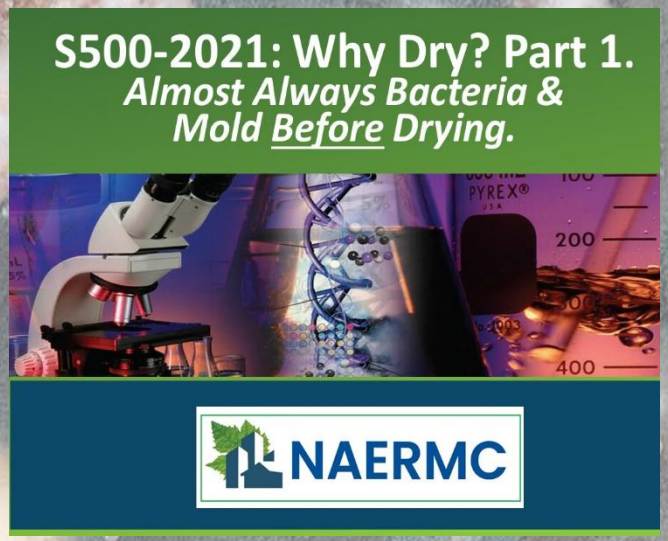
- **Metal Corrosion**: When you painted the cut ends of the metal with Rust-Oleum, was that "worst case" conditions?
- **Fungal Growth Succession**: "The wall assemblies were exposed to excess moisture and elevated humidity to create a low, flow volume water leak". Does not simulate a burst pipe where water flows over always microbial contaminated floor dusts? Worst case? No way.
- **Cabinet Thickness Swell:** Age, details of manufacture, specific gravity, water temperature and other variables of the insured particle board cabinets are always unknown. How is the experiment then "worst case"? Impossible to make such a claim.

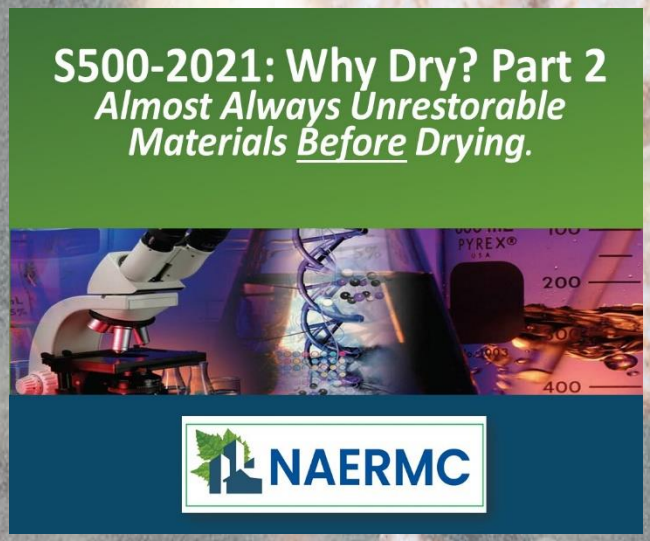
Be Cautioned About Mold Growth Pictures Used To Determine Duration of Water Event

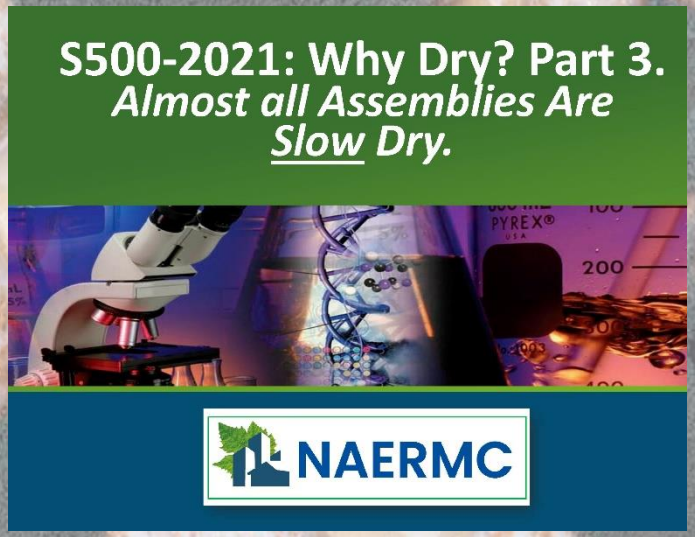
Do not rely on pictures (exemplars) of mold growth or mold color. Why?

1. They are not a substitute for timely, IICRC S500 compliant, water damage inspections that include scientific material testing for determining timing of the water exposure/leak.
2. These Carrier defense expert supplied photos come from unknown sources and unknown conditions. Not shown to be in any way comparable/exemplars. And NEVER published.
3. Insurance Policy language does not in any way exclude such growth after Day 13. Policy language is about the duration of the leak, not duration of subsequent mold or other damage due to trapped or not properly dried out moisture.
4. There will be, 99 times out of 100, residual moisture in walls or under cabinets after a short-term (covered) water event/exposure (**dried out or not**) that will result in subsequent continued mold (IICRC Category 3 water) growth that has no bearing on the duration of the leak (no bearing on coverage).

Why Mold, Even If Dried Out? Because Mold Grows Fast. And Wall Assemblies / Cabinets Are Hard To Dry. As We Explain In Our Mold Licensee Training.







As we explain in our state-approved mold license training, wall assemblies and cabinets in Florida homes are hard to dry.

Mold and bacteria always grow even if professionally dried out.

Q&A. Defense Attorney Asks Plaintiff Expert:

Q. How can you prove that the mold and water damage are not long term?

A. Mold growth and water damage to cabinets are proven to be fast by well known defense expert Dr. Ralph Moon. The insured has only to report the damage. It is up to the defense to prove timing and duration of damage. If the Carrier had performed an industry compliant water damage inspection, they would have scientific evidence to properly answer this question. Now they rely on made up procedures (called exemplars) instead to answer this question.

Q. How can you prove the cause of the damage is covered by the policy?

A. The insured has only to report the damage. It is up to the Carrier to prove that the Cause of Loss is not covered. If the Carrier had performed an industry compliant water damage inspection, they would have scientific evidence to properly answer this question. But they did not.

Now they rely on made up procedures (they call exemplars) instead, to answer this question.

Q&A. Defense Attorney Asks Plaintiff Expert:

Q. How can you prove that the mold and water damage are not long term?

A. Mold growth and water damage to cabinets are proven to be fast by well known defense expert Dr. Ralph Moon. It is the timing of permanent damage that impacts coverage. Not duration.

If permanent damage is <13 days, it triggers coverage.

And there is always permanent damage by day 13 if the water touched either drywall or cabinet bottoms.

It is up to the Carrier to prove otherwise. Which they cannot do because the never perform ANSI-Approved IICRC S500 intrusive water damage inspections.

Fake Science

Doesn't anyone ever read these Fake Science reports by defense industry Forensic Engineers?

Apparently not.

What is amazing is that Moon's "Fungal Growth Sequences" and Moon exemplars/pictures — even though never published / simply typed up / invented by Moon— have been used over the last 10 years to falsely deny coverage for many hundreds of claims.

Challenge Moon under Daubert and reopen the hundreds of claims based on Fraudulent Data/ Fraudulent Research.

Appendix A

Peer Review of Moon Particle Board Expansion Presentation.

Hindman Peer Review of Moon Particle Board Expansion

VirginiaTech
College of Natural Resources and Environment

Sustainable Biomaterials
Brooks Center (0503), 1650 Research Center Drive
Blacksburg, Virginia 24061
540-231-9442 Fax: 540-231-8868
Email: dhindman@vt.edu
www.sbio.vt.edu

June 25, 2018

Gary Rosen, Ph.D.

Dear Gary,

Thank you for asking me to provide a peer review for your critique of "Thickness Swell in Particle Board: A Forensic Tool for the Duration of Loss". In the attached pages, I have included the results of my peer review. Overall, I agree with the main arguments you have presented, mainly that (a) the use of laboratory data detailing specific thickness swell behavior of particleboard under controlled conditions cannot be generalized to any particleboard source where details of the manufacture, age, specific gravity of board, temperature of water and other variables are unknown, (b) the article critiqued does show that irreversible damage is done to particleboard products through the wetting procedures used in a relatively short (i.e. less than 14 days) time period, and (c) no validation of the theory created was every conducted by Moon or any other researcher.

Hindman Peer Review of Moon Particle Board Expansion

General Comments on "Thickness Swell in Particleboard: A Forensic Tool for the Duration of Loss"

I found this article to generally be of poor quality in terms of the presentation (grammar, editing) and the technical content. As a reviewer of many technical articles and previously a journal editor, I would find this content unprintable in its current state. The abstract also tries to make a vague connection between water losses due to flooding and thickness swell of particleboard products. However, the relationship is never discussed and the statements are incredibly vague.

One of the main problems with the article is the misuse and misapplication of the term 'thickness swell'. As the name implies, thickness swell (TS) is the measurement in the change in thickness of the board product after exposure to a wet environment. TS can occur with an increase in moisture content, but does not have to be associated with fiber saturation point (FSP) of the material. ASTM D 1037 *Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials* states "The thickness swelling shall be reported as a percentage of the conditioned thickness." ASTM D 1037 uses a 6 inch by 6 inch or 12 inch by 12 inch sample of the board thickness for testing. Measurements of the board dimensions and weight are taken before testing begins. Samples are "submerged horizontally under 1 inch (25 mm) of potable water maintained at a temperature of 68 plus/minus 2 degrees Farenheit." After the test period, the samples are removed and the dimensions are measured and the sample is re-weighed. This methodology provides a value of the thickness swell of a panel product. ***This is an established procedure commonly used in the wood composites industry for reporting thickness swell.***

Hindman Peer Review of Moon Particle Board Expansion

The method described by Moon uses a homemade contraption with a varying amount of water in the bottom (only refreshed every 3-4 days). No images of the testing apparatus are available, so the exact procedure cannot be shown. This test is highly non-standard and could be very selective in application. I understand that the idea of the work was to simulate the edge of the particleboard in standing water, but I question the temperature controls and methods used. This methodology is measuring 'thickness swell height' which has some properties in common with thickness swell, but will also be dependent upon the wicking and capillary action of water movement through the thickness of the panel.

The paper does attempt to use a variety of different commercial particleboard materials. However, no mention of where these materials came from or specific details upon their manufacture are present. In Thomas Maloney's *Modern Particleboard and Dry-Process Fiberboard Manufacturing*, which is considered one of the most valuable technical sources on the production of particleboard, Maloney talks about the different ingredients used to produce particleboard products. There are a variety of different adhesives, resins and different wood species used as substrates for the production of particleboard. The particular makeup of a panel is not common knowledge and may change depending upon the wood species sources or other market factors. One factor unconsidered in this particular discussion is wax, which is the most common additive, according to Maloney. Wax is mixed with the fibers before pressing to prevent absorption of water by the product which could lead to thickness swell. Comparing these commercial particleboard materials is rather difficult due to the unknown manufacturing parameters of particleboard production.

Hindman Peer Review of Moon Particle Board Expansion

The curves presented for the thickness swell height do not follow a linear relationship. The curves could be described as curvilinear (polynomial), bilinear (two linear slopes) or trilinear (three linear slopes). The regression curve presented has an inherent problem in that the curve does not pass through the origin – to wit, any section of particleboard when exposed to water will immediately have a thickness swell height of around 12 centimeters. This is absurd to compare values for short term durations.

Much of the discussion section of this paper seemed to approach general speculation. Since no tables of values were given in the results, the discussion had few facts to focus on and could only make generalizations about the materials.

Sincerely,

Daniel Hindman

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

An equal opportunity, affirmative action institution

Hindman C.V.

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Education:
B.S., Agricultural and Biological Engineering
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Professional Registrations:
Professional Engineer, Commonwealth of Virginia
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Professional Affiliations:
National Frame Builders Association
American Society of Civil Engineers
Timber Framers Guild
Forest Products Society

Experience:

Hindman has been an Associate Professor in the Department of Sustainable Biomaterials since 2010 and an Assistant Professor since 2003 at Virginia Tech. At Virginia Tech, Hindman's duties include teaching, research and engagement.

Hindman C.V.

Teaching assignments include:

- Wood Mechanics – Class detailing the basic understanding of statics and strength of materials related to wood. An important portion of this class is the relationship of water and wood products.
- Green Building Systems – This class discusses the principles used in green construction including the application of LEED and Earthcraft Virginia standards.
- Design of Wood Structures – This class covers the design of wood structures using the *National Design Specification for Wood Construction* (NDS) and associated building code discussion.
- Timber Engineering – Graduate level class focused on exploration of special topics related to timber engineering. Previous topics have included reliability, wood-moisture relationships, viscoelastic behavior, fracture mechanics, design of post-frame structures, and design of cross-laminated timber structures.

Research topics have included the study of timber design and connections, construction safety, and green building. Funded research projects totaling over $3.3 million have been secured by Hindman while at Virginia Tech from both public and private funding sources. Topics of research have included:

- Studying the intra-ring mechanical properties of wood strands
- Measure the mechanical properties of wood composite I-joists exposed to walking loads from workers
- Testing of fall arrest systems attached to metal plate connected wood truss roof systems
- Manufacturing of southern pine cross-laminated timber

Hindman C.V.

Engagement activities have included education efforts to various professional societies including the National Frame Building Association, the National Wood Flooring Association, Floor Inspectors Guild, and other local groups.

Peer-Reviewed Articles (Total of 35 Published)

- As, N., D. P. Hindman, Ü. Büyüksari. 2018. The effect of bending parameters on mechanical properties of bent oak wood. European Journal of Wood and Wood Products. 76(2):633-641.
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Presentations on Wood Flooring and Moisture Conditions

Since 2008, Hindman has presented research and education lectures on topics related to wood flooring and moisture, including the discussion of engineered flooring construction and layup, test methods for examination of wood flooring defects, and radiant flooring use. Presentations to various groups have included the National Wood Flooring Association (NWFA), the Floor Inspectors Educational Guild, the Appalachian Hardwood Manufacturers, Inc. and the Virginia Forest Products Association.

Consulting

Hindman has conducted various consulting work examining defects related to wood flooring manufacturing, installation and maintenance. Most consulting projects have included laboratory testing (moisture content, specific gravity, Janka hardness, soak-dry cycling, fastener withdrawal testing) but some projects have included site visits.

Appendix B
Peer Reviews of Moon's "Fungal Growth" Presentation.

Appendix B

What We have in Appendix B:

- A copy of Moon's Fungal Growth Succession" with paragraphs for discussion numbered 1-17.
- Questions for Moon about Moon's Fungal Growth by Gary Rosen — followed by Comments by Dr. John Shane along with Shane's resume.
- Questions for Moon about Moon Fungal Growth by Gary Rosen — with additional comments by Dr. Joe Spurgeon. Followed by Spurgeon's Opinions on using mold genus/species to determine water damage incident age. Along with his resume.

Numbers correspond with questions for Moon below.

Fungal Growth Succession on Gypsum Board Wall Assemblies

Ralph E. Moon, Ph.D. [1], Michael Bass[1], Chin S. Yang, Ph.D.[2]

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SUMMARY

A 4-month (117 days) test simulated conditions favorable for fungal growth on 6 finished wall assemblies exposed to continuous moisture. Visible growth first occurred on the wood sill plates where moisture was in direct contact with the assembly. *Aspergillus* and *Trichoderma* structures were identified on Days 4 and 7 respectively (Table 1). *Chaetomium* ascomata and *Cladosporium* were observed on Day 14. Individual *Chaetomium* spores, *Alternaria* and *Pestaliopsis* were identified on Day 28. *Penicillium* was identified on Day 46 and *Bipolaris* were identified on Day 50. *Curvularia* was identified Day 50. The most diverse fungal growth was identified underneath the base trim followed by the back side of the gypsum board. An evaluation of 1000+ spore trap, ambient outdoor air samples from Florida revealed Basidiomycetes, *Cladosporium*, *Penicillium*, *Aspergillus* and *Curvularia* as the major taxa.

1

IMPLICATIONS

The fungal species present on wet gypsum board wall assemblies show a sequence of fungal succession. Under conditions of constant moisture source, elevated relative humidity and stable temperature, fungal identification can support opinions of the duration of a water loss for periods ranging from several days to several months.

2

KEYWORDS

Gypsum wallboard, fungal succession, duration of loss, continuous, repeated water exposure

INTRODUCTION

Water damage is a frequent occurrence in the United States and if moisture is sustained, causes diverse fungal growth to occur over a long period of time. Fungal growth on wall assemblies was investigated to determine sequential changes in the fungal population and support opinions

regarding the duration of a water loss. The wall assemblies were exposed to excess moisture and elevated humidity to create conditions of a low, flow volume water leak. Moisture measurements documented the moisture content (MC) in the wall assembly and relative humidity (RH) inside the test chamber. Three of six wall assemblies were constructed with pressure treated (PT) lumber to compare the fungal inhibiting properties to non pressure treated (NPT) wood (Southern Pine). Though PT lumber contains fungal inhibitors, the product warrantee excludes surface mold, mildew and fungi associated with weathering since weathering is not wood decay.

Spore trap samples from ambient outdoor air samples from Florida were compared to the fungal species identified during the test to correlate the dominant fungal taxa to their occurrence on the wall assemblies, particularly, gypsum board.The investigation pursued five questions: (1) What grew? (2) Was there a predictable sequence? (3) Which wall assembly components supported the most diverse growth? (4) Did wood treatment chemicals inhibit species diversity? and, (5) Was fungal occurrence related to their environmental abundance?

METHODS

Six, 18" x 18" x 6" wall assemblies were constructed using 5/8 inch wall board (US Gypsum), Southern Pine 2 x 4 studs [Pressure treated (PT) and non pressure treated (NPT)], finger-jointed pine trim, two coats of BEHR Brand wall (flat) and trim (semi gloss) paints, white latex trim sealant and sheet rock fasteners. The horizontal trim was removable to allow access to the underlying gypsum board and unpainted wood trim surfaces for sampling. Base line and successive moisture measurements were obtained. At the start, each wall assembly was damp wiped with isopropyl alcohol to remove surface oils from handling and possibly kill occurring spores. The assemblies were placed on a towel inside a polyethylene box or test chambers, (20" x 20" x 20") and covered with a loose fitting, fluted filter containing activated carbon for odor control. Three wall assemblies were placed per test chamber and water (200 ml per box) was added daily. The test chambers were positioned above the floor to limit insect contact and tracking. HOBO Data Loggers (onsetcomp.com) were attached to the interior wall of each test chamber to record temperature and relative humidity.

The test chambers were opened twice each week for the first two months and biweekly thereafter. During sampling, each wall assembly was removed with gloved hands and placed on a plastic sheet that was previously wiped with isopropyl alcohol. A label was prepared for each wall (Wall No. and date) and photographed on all sides and following removal of the horizontal base trim. Tape-lift samples (Scotch Brand, clear) were used to adhere fungal growth for placement on labeled glass slides. The slides were examined and photographed using light microscopy (Olympus, Model CX-41) and identification confirmed at Prestige EnviroMicrobiology, Inc. A total of 19 sampling events were conducted over the 4-month investigation. Following sampling, a penetrating moisture meter (Tramex, Inc.) documented the percentage moisture content at 2 inch intervals up the gypsum board. Ambient air samples

obtained from 2001 through 2010 and from within the State of Florida were tabulated for evaluation and comparison.

RESULTS

Moisture Content, Temperature and Relative Humidity: Moisture content was 35% at a measured height of 4 inches above the floor in all walls for the entire test period. Moisture successively decreased between 4 inches and the top (18 inches) where the gypsum board contained between 15 to 19% moisture. The interior temperature was held near 76°F while the relative humidity oscillated between 70 and 95% depending on the watering schedule.

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Fungal Growth and Sequence: Predictable fungal growth sequences were observed. Small, diffuse mats of mycelial growth were visible within two-three days of incubation. Visible growth first occurred on 50% of the wood sill plates where moisture was in direct contact with the assembly (Table 1). *Aspergillus* and *Trichoderma* structures were identified on Day 4 and 7 respectively. Immature *Chaetomium* ascomata and *Cladosporium* were observed on Day 14. Individual *Chaetomium* spores, *Alternaria and Pestaliopsis* were identified on Day 28. *Penicillium* was identified on Day 46; *Bipolaris* was identified on Day 50. *Curvularia* was identified on Day 53.

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Table 1. First Appearance Sequence

		Experimental Day									
Identification	Frequency *	2	4	7	14	28	46	50	53	101	117
Mycelium	50%	X									
Aspergillus	50%		X								
Trichoderma	17%			X							
*Chaetomium**	34%				X						
Cladosporium	34%				X						
Chaetomium	83%					X					
Alternaria	17%					X					
Pestaliopsis	17%					X					
Penicillium	17%						X				
Bipolaris	17%							X			
Curvularia	50%								X		
Mites	50%										X

* Observed walls/total walls on first day of appearance

** Immature *Chaetomium* ascomota

Observation of the wall assemblies and microscopic examination of samples revealed changes in fungal growth dynamics. Little growth occurred during the first 7 Days. Days 7 through 53 revealed a vibrant fungal population, newly identified species and colonization of new areas. Day 56 through 89 were stable, while Days 101 through 117 showed cellular discoloration and senescence. No negative control was included in the experimental design; however, upper areas of the wall assembly that absorbed moisture from humidity only (similar to a negative control) did not support visible fungal growth until Day 101 when *Aspergillus* was identified. This observation was consistent with home interiors exposed to sustained conditions of elevated humidity that support *Aspergillus* growth.

Fungal Diversity

Average taxa were determined by listing the number of taxa (fungal Genera) identified on each wall assembly piece, summing the total taxa from all wall assembly pieces and dividing by number of walls as shown below.

$$\text{Average Taxa} = \frac{(\text{Wall 1, base trim, 7 species}) + (\text{Wall 2, base trim, 6 species}) + \ldots}{\text{No. of Walls}}$$

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Among the eight wall assembly areas, the most diverse fungal taxa and density were identified behind the horizontal base trim (6.8 average taxa each piece) and on the unpainted back of the gypsum board (6.1 average taxa each) where moisture content was high (>20%). The least diverse taxa and lowest density were identified on the painted vertical trim (0.3 average taxa) and the unpainted vertical stud (0.5 average taxa). The next lowest diversity was the painted front of the gypsum board and side face of the wall assembly (both 1.0 average taxa), and the painted horizontal base trim (1.1 average taxa). Low diversity was attributed to chemical inhibitors in the paint and low moisture content (vertical stud). Mites were identified during the final sampling event (Day 117) on the unpainted gypsum board and behind the horizontal trim where moisture and food (fungal growth) were abundant. Where diverse fungal taxa were present, fungal growth was nearly continuous and moisture content was near saturation (>30%). Fungal density on painted surfaces and drier areas was scattered and sparse.

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Pressure v Non Pressure Treated Sill Plates

Both PT and NPT lumber supported microbial growth. Over the 117 day experiment, fungal diversity was greater on the PT sill plates (4.0 average taxa) than the NPT sill plates (2.0 average taxa). The data revealed greater diversity as the experiment progressed beyond 50 days. During the first 50 days, PT sill plates supported 3 fungal taxa as compared to 1 fungal taxa in the NPT sill plates. From Days 53 through 117, fungal diversity increased to 5 taxa identified on the PT and 3 taxa on the NPT. Species diversity was not adversely affected by either PT or NPT sill plates. For example, the average taxa calculated on the unpainted gypsum board on the PT sill plates was 6.1 while the average taxa on the unpainted gypsum board on NPT sill plates was 6.3.

Comparison with Ambient Outside Fungal Spore Populations: Comparison between ambient spore frequencies and sequence of appearance on the wall assembly revealed that some fungal species that exhibited high ambient frequency (>25%) (*i.e., Aspergillus, Cladosporium, and Alternaria*) corresponded well to those observed during early growth (First 28 days) (Table 2). In contrast, some spores that exhibited low ambient frequency (*i.e., Trichoderma* and *Chaetomium*) also exhibited occurrence during early growth. The apparent success of low ambient frequency spores was attributed to the appropriateness of the surface, nutrients and moisture content.

Table 2. Comparison of Fungal Frequency (Outside Control, n=1039) to Fungal Succession

Identification/Sequence	Outside Frequency (%)	Occurrence	Location
Aspergillus	59	Day 4	Horizontal Stud
Trichoderma	<0.01	Day 7	Horizontal Stud
Chaetomium ascomata	4.6	Day 14	Under Trim
Cladosporium	61	Day 14	Back of Gypsum Board
Chaetomium	4.6	Day 28	Under Trim
Alternaria	28	Day 28	Under Trim
Pestaliopsis	3.4	Day 28	Under Trim
Penicillium	74	Day 46	Back of Gypsum Board
Bipolaris	21	Day 50	Back of Gypsum Board
Curvularia	49	Day 53	Back of Gypsum Board

DISCUSSION

Few studies have examined fungal growth on building materials over an extended period of time or evaluated the sequence of their appearance. A Danish study of construction materials from 23 buildings revealed the most frequent fungal species were *Penicillium* (68%), *Aspergillus* (56%), *Chaetomium* (22%), *Ulocladium* (21%), *Stachybotrys* (19%) and *Cladosporium* (15%). The duration that the materials were wet, was not reported (Graveson *et al.*, 1999). In a gypsum board sanitation study, an unidentified, white hyphal mat was identified during days 7-10 of the 35 day test period. The control samples yielded *Penicillium spp.* and *Chaetomium spp.* on the finished paper side and *Aspergillus spp.* and *Cladosporium spp.* on the kraft paper side. Fungal growth was not seen with the unaided eye for four weeks (Price and Ahearn, 1999). A study of moldy carpets, plasterboard and wallpaper of unknown water exposure duration in three hotels in Florida and Georgia, identified 11 fungal species including *Chaetomium*, *Alternaria*, *Cladosporium*, *Stachybotrys*, *Ulocladium*, *Acremonium*, *Aspergillus*, *Phoma* and *Penicillium* (Morgan-Jones and Jacobsen, 1988). A previous 60-Day fungal growth study on wet fabrics revealed similar taxa occurrence (*Trichoderma, Penicillium, Aspergillus, Cladosporium, Gliocladium, Paecilomyces, Stachybotrys and Curvularia*) (Moon *et al.*, 2004).

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An evaluation of the top five fungal taxa identified both indoors and outdoors in the United States identified *Cladosporium*, *Penicillium*, *Aspergillus*, basidiomycetes and *Alternaria* in descending order (Yang *et al.*, 1993). Our evaluation identified a similar sequence of taxa (basidiomycetes, *Cladosporium*, *Penicillium*, *Aspergillus* and *Curvularia*) implying wider implications than Florida. Fungal taxa originated from three sources: airborne sources, water supply and building materials. Early fungal growth under the base trim suggested that some taxa (*i.e., Chaetomium, Alternaria* and *Pestaliopsis*) represent bio-burden on the building materials (Table 2).

Handling of the wall assemblies with gloves helped to limit cross contamination. The most predominant factor that influenced growth was moisture content. The most diverse fungal growth occurred where the substrate sustained moisture behind the trim, and along the lower portions of the wall assembly. Fungal diversity was also influenced by carbon source.

Three factors explain the observed results: available moisture, favorable carbon substrate and ambient spore population. As substrates gain moisture, the likelihood to support greater diversity also improves. The earliest observed taxon, *Aspergillus*, had a high ambient spore frequency.

RECOMMENDATIONS AND CONCLUSIONS

Sampling revealed a predictable fungal sequence consisting of nine fungal taxa representing both high and low frequencies of ambient abundance. A larger sample size is recommended for future studies. Among the wall assembly components, the most diverse fungal growth occurred on saturated, unpainted gypsum wall board surfaces. The use of PT or NPT lumber for wall construction expressed no quantitative differences in fungal diversity on any parts of the wall assembly.

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Questions for Moon Daubert Challenge related to the numbers on the left hand side (attached) of Moon "Fungal Growth Profiles" by Gary Rosen, Ph.D.

Comments in Red by John D. Shane, PhD 3-22-22

Summary: This paper bears little resemblance to science. It is fraught with errors, lacks documentation as well as "methods and procedures".

1. Penicillium identified on Day 46. I have 10 studies published in scientific peer reviewed journals that all say Penicillium starts to grow in days. How can you conflict with all that proof to the contrary? What exactly was Dr. Yang's involvement in this project? Did he read this article?
   Comment: Several papers relating to mold growth on wall board do show the rapid growth of Penicillium and Aspergillus. Also, the authors (Moon, Bass, Yang) do not specifically say how they observed the mold growth. They may have totally missed the growth by not using other methods, other than microscopic methods. Also, they do not define what constitutes growth. My own observations show several kinds of spores germinating almost immediately under the microscope. Further growth depends on what the mold is growing on, with water availability, and substrate(s). All their timelines seem to be far too long. Also, the authors do not disclose any species identification. Most peer-reviewed papers on mold growth include species. What is the relevance of the outdoor "Florida" ambient air samples? Their major taxa is not right. What days / months were used?
2. Duration from several days. Once there is mold growth, there is permanent damage that triggers coverage. You must remove and replace drywall with new. Duration is of no importance. Only the timing of permanent damage in terms of coverage. According to an earlier review by Chin Yang (*Fungal Contamination as a Major Contributor to Sick Building Syndrome*) light and air movement are also important factors.
   How do you replicate these factors and all other factors representing mold growth (temperature, humidity, water source, etc.) so this study produces exemplars for determining timing and duration of mold growth in actual homes?
   Comment: Fungal spore activation is an extremely complex process, and the authors give no evidence or citations regarding it. Plus, I agree with you that the authors give no way to replicate the conditions in which to trigger spore germination. Comment: The authors speak of "species" and yet only list "genera". Do they even know what a "species" is? Evidence that Chin did not read this paper. "...fungal identification can support opinions of the duration of a water loss." – opinions not

supported by references. Moisture content alone is not that relevant because A_w of substrates vary. Further, there are no sorption isotherm curves that would show disparities between building materials and growth. The paragraph under the subsection "Implications" is so obtuse that one cannot really say much about it.

3. "low, flow volume water leak". Not sure what this means but it certainly does not replicate a burst pipe with immediate water saturation conditions. How does this "study" apply to leaks that are not a "low, flow volume water leak"?

   Comment: Agree. "low, flow (sic) volume water leak is not defined and what was the temperature of this simulated water loss water?

4. Here you say six wall assemblies in the "study". Elsewhere you say eight. Where are the pictures for this report?

   2nd paragraph Introduction: "The investigation pursued five questions: (1) What grew? (2) Was there a predictable sequence? (3) Which wall assembly components supported the most diverse growth? (4) Did wood treatment chemicals inhibit species diversity? and, (5) Was fungal occurrence related to their environmental abundance?"

   Comment: Regarding the 5 questions listed in the 2nd paragraph of the introduction, there is not enough data or even logical consistency in the paper to pursue 5 questions, let alone answer them. Again, the authors mention "species" but only list "genera".

5. 5/8 inch wall board. Homes use ½" wall board. Why pick a type of wall board never used in homes? Have you performed an experiment to prove mold grows the same on both types/thickness of wallboard.

   Comment: 5/8" usually used for ceilings and fire-prescribed walls. The ½" sheetrock is normally used for walls. Why use 5/8"? Again, no reasons given or "materials and methods" to critique or follow.

6. Studies show that all drywall comes from the manufacturer with mold spores on the surface. Why kill the mold spores on the surface before testing? Certainly, this is not done when the builder is building the house. Is that to make sure mold germinates slower due to lack of spores? Why do you call this study "exemplars"?

   Comment: If they wanted to sterilize the wallboard, they should have sterilized the wallboard with e.g., ethylene oxide. Isopropyl wipe down does virtually nothing for sterilizing porous material. Where was the control using non-sterilized wallboard? What was the drying time of the alcohol wipe down? It is axiomatic that wallboard

comes "pre-inoculated" from the manufacturer, storage, and shipment. If the wallboard was made outside of Florida and shipped here, where are the "ambient" air readings for those areas because that would surely impact what is trapped in the wallboard. Plus, where is the control wallboard as a builder would install it? It would certainly be a control sample. No control samples are mentioned – there should have been more than one type of control sample(s). Why a carbon filter for "odor control". That is random. **[GR: Because this study was performed in Moon's office.)**

7. This is a huge issue. You say "water". What type of water? **(Agreed, what kind of water? Again, no scientific method to follow. Just sloppy science by some guy with a PhD.)** Impossible to reproduce this experiment without a specification on the water used.

   In the real world, released water flows over always mold contaminated floor dust (as per IICRC.) By using clean water, you eliminate mold contaminated flood water as a source mold spores. This is done to delay the onset of the mold growth.

8. Test chambers opened twice per week. How long? How do we reproduce this experiment? Not enough information is provided to reproduce. Not science unless it is reproducible by others. Not science unless performed more than once. If not repeated there is absolutely no way to determine error rate or statistical confidence limits. **(No control chamber to compare with. What are the effects of the opening and closing of the chambers? What were the environmental parameters of the room, i.e., was it controlled with HEPA filtered air, etc. Also, what was the sampling strategy of the wall for the tape lifts? None is given.)**

9. Aspergillus and Penicillium each have dozens of species. **(There are hundreds of species in each of the genera)** Some fast growth and some slow growth species, but these can only be distinguished using culture methods. The testing method used is not appropriate for this type of experiment. **(Yes, no culture data to identify species and no data on where the tapes were taken and what species cultured at each place. Would species diversity be different at different places along the moisture gradient and time, and sorption isotherm?)** **[GR: Of course, as you know the variation is huge with the water loving high A_w at the bottom.]**

10. Where is the data? **(Again, with no provenance of the wallboard, the ambient data are not that helpful. Where in the state of Florida are these ambient samples taken and during what months? Ambient air diversity is highly variable through time and space.)**

Questions for Moon Daubert Challenge related to the numbers on the left hand side (attached) of Moon "Fungal Growth Profiles" by Gary Rosen, Ph.D.

Comments in Red by John D. Shane, PhD 3-22-22

11. "Predictable fungal growth". What does "predictable" mean here? **(Predictable? What was the null hypothesis to state "predictable"? Also, the comment about mycelial mat is very interesting. What was the identification of this mat and how does it relate to the ambient air samples, e.g., non-sporulating fungi is mostly found to be basidiospore germination from ambient air?)**
12. Two common molds start to grow in days. **("Structures" of Aspergillus and Trichoderma is interesting and undefined, viz., hyphal growth, fruiting bodies, conidia, diameter of colonies, etc.)**
13. I have 10 papers that says Penicillium grows in a few days. No possibility that Dr. Yang was involved with the "study". **(Again, bad science. It is easy to demonstrate in the literature the rapid germination of Penicillium, and other spores. Also, "Bipolaris", really. Did they watch them germinate to determine that genus – necessary to identify that exact genus. "Immature" Cladosporium? How was that determined? If you can identify Cladosporium, they are mature because of the way the sporulate.)**

    Comment: Mold follows a strict ecology of growth depending on several factors. Curvularia is usually not an end point. What were the environmental parameters of Day 53. And where is the Day 53 control – or ANY control. Throw us a bone here!! Oh wait, they say that they have a "similar to a negative control" observation. Too late, too little and does not count.
14. Earlier you said six. Explain. Here you talk about "density". Where is this defined? Where is the data to support this? **(Do any of the other authors know what this guy wrote or read the "study"?)**
15. Most mold on the unpainted back side of gypsum board. Then why do you perform inspections only on the front? Why do you or Carriers never performed inspections within walls as required by IICRC S500? **I also agree that cavity wall samples should be taken more often to prove water damage.)**
16. Mold inhibitors in the paint on the surface of the front side of the drywall?

    (The authors state as fact things about paint inhibiting mold growth, etc., but never cite and example from the literature or from their negative control – oh wait, they did design an experiment so there were no negative controls……)
17. Fungal taxa originated from three sources. This is an absurd claim. You sterilized the drywall (building materials) with alcohol, and you used chlorinated tap water rather than mold contaminated floor water that would always be present in a real-world

Questions for Moon Daubert Challenge related to the numbers on the left hand side (attached) of Moon "Fungal Growth Profiles" by Gary Rosen, Ph.D.

Comments in Red by John D. Shane, PhD 3-22-22

water event.

Comment: This seems very low in diversity. Species would be highly relevant here. Must culture to find out. Ambient data are so random as cited here that they are useless. What about ambient sampling in the experiment room – pre, during and post handling of materials? What do the authors mean by "similar sequence of taxa"? Where is that defined, or data given?

"Bio-burden on the building materials" what is meant here? I have no idea.

Cross contamination is tacitly admitted here, "helped to limit cross contamination" – so was there cross-contamination? Again, controls??

"The most predominant factor that influenced growth was moisture content" – What kind of moisture content? RH, substrate, etc. How do they make that claim?

"Fungal diversity influence by carbon source" – of what? The wallboard or wood?

Their three factors were not proven at all.

High ambient spore frequency of Aspergillus is not proven in the literature or clinical data and is not even the most frequent or abundant.

They say, "nine fungal taxa", but they list 10.

They state, "no quantitative differences", yet give no real quantification data. How can we know what conclusions to draw with no statistics? This makes the piece an opinion piece at best.

They give citations, but they don't relate them to anything specific in the paper.

Finally, the excerpt from the Ralph Moon deposition where he defines "peer review" is interesting. The person being deposed [GR: Moon] does not understand what "peer review" means!

InspectorLab is a full service environmental analytical laboratory, specializing in mold analysis, servicing home inspectors and mold testing professionals nationwide. The laboratory is headed by Dr. John Shane, PhD mycologist and nationally recognized indoor air quality expert. The laboratory offers the fastest turnaround time and lowest price in the industry on all visual mold and air samples. InspectorLab also provides free, same day IAQ pump calibration service.

About the Doctor

Dr. John D. Shane, PhD mycologist on staff at InspectorLab has 35+ years experience identifying mold spores. He has created and taught McCrone Research Institute classes on Indoor Air Quality, Identification of Fungal Spores and House Dust to hundreds of IAQ industry students.

Dr. Shane has been Nationally recognized as a mold and IAQ expert in addition to his books on Identification of Mold Spores and House Dust. He is a Certified Residential Mold Inspector (CRMI) and an Accredited Indoor Environmental Hygienist FL- 0052, Florida State licensed Microbial Assessor, and Florida State Mold Remediator.

Dr. Shane is a frequent featured and invited speaker around the country to teach the identification and interpretation of mold and house dust in indoor and outdoor environments, and has personally conducted thousands of indoor air investigations.

Dr. Shane has also served as an expert witness on high profile mold cases involving millions of dollars.

See Peer-Reviewed published research below.

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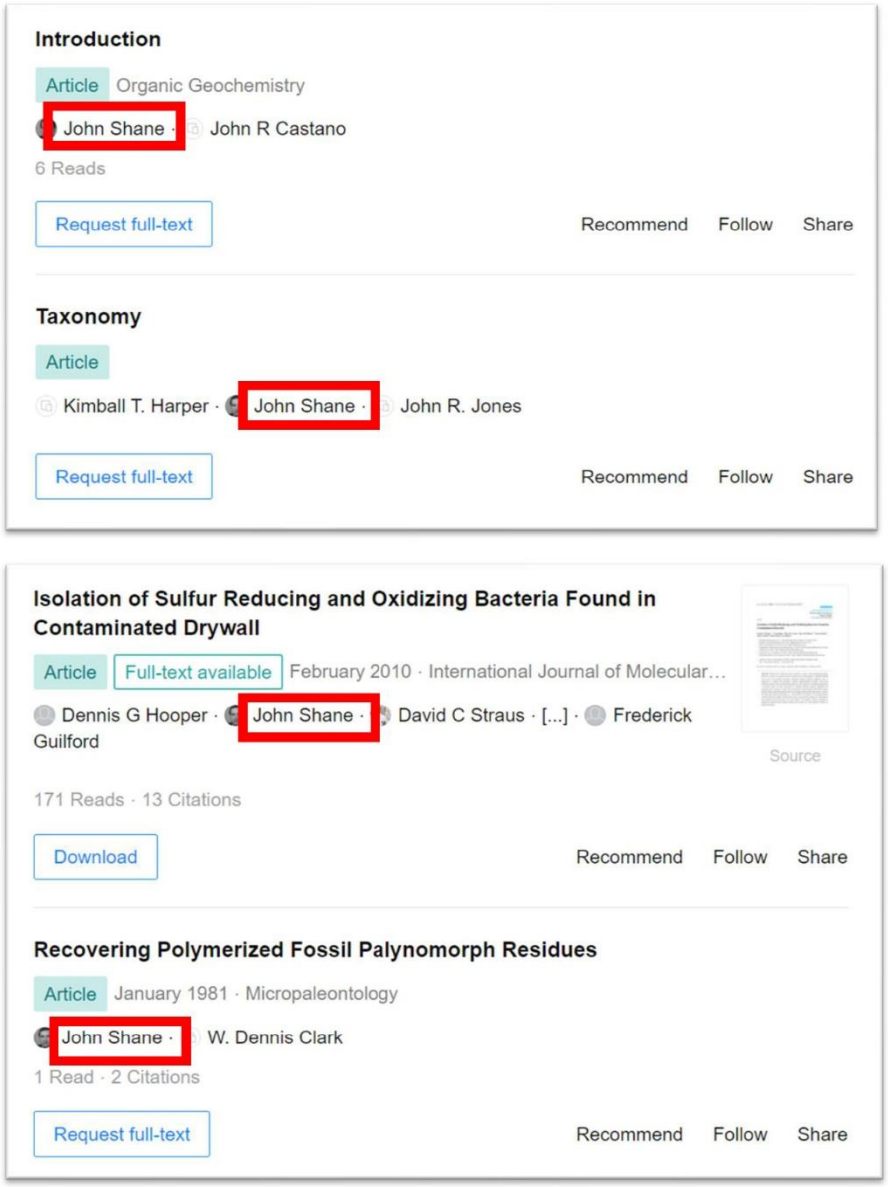

InspectorLab 3301 N.W. 55th St. Ft. Lauderdale, FL 33309
https://inspectorlab.com/

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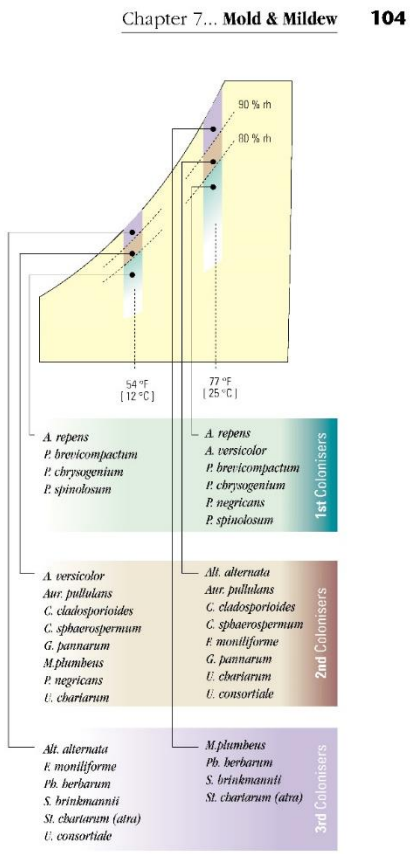
OPINIONS ON ESTIMATING THE AGE OF A WATER INTRUSION INCIDENT

The detection of *Chaetomium, Penicillium*, or other fungal genera is not, in itself, a reliable method for estimating the age of a water intrusion incident.

"Humidity Control Design Guide"; Harriman, Brundrett, Kittler; ASHRAE, 2001.

Figure 7.7 I illustrated in Chapter 7: Mold & Mildew. It illustrates what is commonly referred to as the "succession of fungi", which describes the progression of fungal species with the increasing moisture content (water activity) of a substrate such as drywall after a typical water event. Assuming a water intrusion incident has just affected a wall cavity, examples of the appearance of fungal genera would be expected to be as follows based on moisture accumulation (increasing water activity).

If there was a flood (immediate wet conditions) all species would immediately start to germinate.



- Drier Conditions: *Aspergillus, Penicillium*.
- Damp conditions: *Aspergillus, Cladosporium, Ulocladium, Aureobasidium, Fusarium*;
- Wet conditions: *Stachybotrys, Memnoniella, Ulocladium, Fusarium*;

The above partial list of genera from Figure 7.7, which lists fungal species, illustrates two points relevant to determining the age of a water intrusion incident. First, many of the fungal genera (and species) overlap between moisture conditions. Therefore, their detection is neither a clear indication of moisture condition nor time since the water intrusion incident. Second, wet, damp, and dry conditions often occur in a vertical gradient on the same wall as the result of a water intrusion incident. For example, the drywall can be wet 6-inches above the floor, damp at 18- inches, and dry at 24-inches.

It is not unusual to collect *Stachybotrys* near the floor, *Aspergillus* and *Cladosporium* in the middle zone, and *Cladosporium* and *Penicillium* from the upper zone. Such samples can be collected shortly after the water intrusion incident has occurred, and during the same site visit.

The following discussion is based on "Recognition, Evaluation, and Control of Indoor Mold", 2nd Ed.; AIHA. Table 4.3 in the 2nd Edition lists the fungal species growing on Wallboard

Table 4.3 lists the fungal species growing on wallboard samples. *Penicillium, Chaetomium and Stachybotrys* species are described as Common, while *Penicillium* is described as Common and Frequent.

Table 4.3 — Filamentous Fungi Growing on Gypsum Wallboard Samples

Common	Frequent	Infrequent	Rare
Aspergillus glaucus (= *Eurotium herbariorum*)	*Aspergillus ruber*	*Aspergillus flavipes*	*Acremonium charticola*
A. nidulans	*Aureobasidium pullulans*	*A. flavus*	*Alternaria alternata*
A. sydowii	*Penicillium brevicompactum*	*A. fumigatus*	*A. tenuissima*
A. ustus complex	*P. citrinum*	*A. montevidensis*	*Apiotrichum* (=*Hyalodendron*) *lignicola*
A. versicolor sensu lato, including *A creber*	*P. corylophilum*	*A. niger*	*Ascotricha chartarum*
Chaetomium globosum	*P. decumbens*	*A. ochraceus*	*A. erinacea*
Cladosporium sphaerospermum	*P. dierckxii*	*A. pseudoglaucus*	*Aspergillus caespitosus*
Memnoniella echinata	*P. glabrum*	*Botryotrichum piluliferum*	*A. niveus*
Paecilomyces variotii	*P. simplicissimum*	*Chaetomium elatum*	*A. penicillioides*
Penicillium aurantiogriseum	*P. spinulosum*	*Dichotomopilus* (=*Chaetomium*) *indicus*	*A. terreus*
P. chrysogenum sensu lato, (including *P. rubens*)	*Talaromyces purpurogenus*	*Geomyces pannorum*	*A. wentii*
P. commune	*T. variabilis*	*Gliomastix murorum*	*Botryotrichum* (=*Chaetomium*) *murorum*
Sarocladium strictum	*Scopulariopsis brevicaulis*	*Oidiodendron griseum*	*Curvularia inaequalis*
Stachybotrys chartarum		*Penicillium crustosum*	*Dichotomopilus* (=*Chaetomium*) *funicola*
Trichoderma harzianum		*P. expansum*	*Didymella* (=*Phoma*) *glomerata*
		P. griseofulvum	*Exophiala jeanselmei*
		P. minioluteum	*Lecanicillium aphanocladii*
		P. oxalicum	*L.* (=*Verticillium*) *lecanii*
		P. rugulosum	*Microascus* (=*Scopulariopsis*) *chartarum*
		P. solitum	*M. paisii* (=*S. brumptii*)
		P. thomii	*Neurospora* (=*Chrysonilia*) *sitophila*
		Phoma herbarum	*Oedocephalum glomerulosum*
		Scopulariopsis candida	*Oidiodendron cereale*
		Trichoderma deliquescens (=*Gliocladium viride*)	*Paraphoma* (=*Phoma*) *fimeti*
		T. koningii	*P. funiculosum*
			Phialophora fastigiata
			Phoma leveillei
			Pleurostomophora (=*Phialophora*) *richardsiae*
			Pseudopithomyces (=*Pithomyces*) *chartarum*

Complicating factors that can affect fungal growth on a substrate are discussed in Chapter 4 of the 2nd Edition. The following factors can affect which fungi are detected:

- Quality of nutrients at a particular Aw can affect species dominance;
- Substrate temperature can affect species preference;
- Fungi excrete moisture as a metabolic byproduct, extending the growth period;
- Intermittent drying and wetting of the substrate can occur.

In Section 6.7 of the 2nd Edition it states "although noninvasive techniques can be useful, they can also result in false negative and false positive results." Therefore, examination of the wall cavity is recommended.

Questions for Moon Daubert Challenge related to the numbers on the left hand side of Moon "Fungal Growth Profiles" by Gary Rosen, Ph.D.

Comments in blue by Joe Spurgeon, Ph.D.

1. Penicillium identified on Day 46. I have 10 studies published in scientific peer reviewed journals that all say Penicillium starts to grow in days. How can you conflict with all that proof to the contrary? What exactly was Dr. Yang's involvement in this project? Did he read this article?

   RH% varied from 70% to 95%, but was not held constant. So this was an uncontrolled variable. Growth rates were very slow in this study compared to my field experience for many water intrusion incidents.

2. Duration from several days. Once there is mold growth, there is permanent damage that triggers coverage. You must remove and replace drywall with new. Duration is of no importance. Only the timing of permanent damage in terms of coverage.
   What about Ph of the water? That is also a very important factor in mold germination. How do you replicate this factor so this study is actually an exemplar for determining timing and duration of mold growth in actual homes?
   According to an earlier review by Chin Yang (*Fungal Contamination as a Major Contributor to Sick Building Syndrome*) light and air movement are also important factors. Again, how do you replicate these factors so this study is actually an exemplar for determining timing and duration of mold growth in actual homes?

3. "low, flow volume water leak". Not sure what this means but it certainly does not replicate a burst pipe with immediate water saturation conditions. How does this "study" apply to leaks that are not a "low, flow volume water leak"?

   This study does not replicate conditions after a burst pipe.

4. Here you say six. Elsewhere you say eight. Where are the pictures for this report?

5. 5/8 inch wall board. Homes use ½" wall board. Why pick a type of wall board never used in homes? Have you performed an experiment to prove mold grows the same on both types/thickness of wall board.

6. Studies show that all drywall comes from the manufacturer with mold spores on the surface. Why kill the mold spores on the surface before testing? Certainly this is not done when the builder is building the house. Is

that to make sure mold germinates slower due to lack of spores? Why do you call this study “exemplars”.

7. This is a huge issue. You say “water”. What type of water? Impossible to reproduce this experiment without a specification on the water used.

   In the real world, released water flows over always mold contaminated floor dust (as per IICRC .) By using clean water you eliminate mold contaminated flood water as a source mold spores. This is done to delay the onset of the mold growth.

8. Test chambers opened twice per week. How long? How do we reproduce this experiment? Not enough information is provided to reproduce. Not science unless it is reproducible by others. Not science unless performed more than once. If not repeated there is absolutely no way to determine error rate or statistical confidence limits.

9. Aspergillus and Penicillium each have dozens of species. Some fast growth and some slow growth species but these can only be distinguished using culture methods. The testing method used is not appropriate for this type of experiment.

10. Where is the data?

11. “Predictable fungal growth”. What does “predictable” mean here?

    I agree with you. Plus, as already stated, times to visible growth were not consistent with field experience for many water intrusion incidents, so how relevant were the conditions of the study to field conditions? Then how relevant were the conclusions?

12. Two common molds start to grow in days. Again, once there is mold growth, there is permanent damage that triggers coverage. You have to remove and replace drywall with new. Duration is of no importance regarding coverage. Only the timing of permanent damage in terms of

coverage.

13. I have 10 papers that says Penicillium grows in a few days. No possibility that Dr. Yang was involved with the "study". T

14. Earlier you said six. Explain. Here you talk about "density". Where is this defined? Where is the data to support this?

15. Most mold on the unpainted back side of gypsum board. Then why do you perform inspections only on the front? Why do you or Carriers never performed inspections within walls as required by IICRC S500?

    Good support for wall cavity sampling, however.

16. Mold inhibitors in the paint on the surface of the front side of the drywall? See 15.

17. Fungal taxa originated from three sources. This is an absurd claim. You sterilized the drywall (building materials) with alcohol and you used chlorinated tap water rather than mold contaminated floor water that would always be present in a real world water event.

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Tifton, GA 31794

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Web Site: expertonmold.com

EDUCATION

MBA — Real Estate Finance and Entrepreneurial Management
The Wharton School; University of Pennsylvania, Philadelphia, PA.; 1981

Ph.D. — (A) Environmental Health, Graduate School of Public Health
(B) Analytical Chemistry, Graduate School of Chemistry
Air Pollution Fellow, University of Pittsburgh, Pittsburgh, PA.; 1972

B.S. — Major: Chemistry Minor: Mathematics
Indiana State University, Terre Haute, Ind.; 1968

MOLD INVESTIGATIONS

Microbial investigations [mold, allergens]; Sick Building Syndrome; Indoor Air Quality

- 40-story office tower, New Orleans, LA
- Hotels: Anaheim, CA, Garden Grove, CA; Santa Monica, CA
- University library, Orange, CA
- Recording studios, Los Angeles (three)
- NOAA headquarters, 3 office towers, Silver Spring, MD
- US EPA Region VIII ESD Laboratory, Golden, CO
- University of North Carolina, Chapel Hill, NC
- US DOT headquarters building, Wash., DC
- US EPA headquarters building, Wash, DC
- Legionella response, Lead IH, SSA Western Process Center, Richmond, CA
- Day care centers & Pre-schools
- 20 residences in metropolitan Houston, TX.
- 80-unit apartment complex, Bakersfield, CA
- 100-unit condominium complex, Los Angeles, CA
- 200-unit condominium complex, Santa Ana, CA.
  Frank Sinatra residence, Palm Springs, CA
- Steven Spielberg, Movie Props, Warehouse, Santa Monica, CA
- Erin Brokovich residence, Agoura Hills, CA. [featured on "48 Hours"]
- Frank Lloyd Wright house, Virginia Beach, VA
- Gerald Ford residence, Fairfax, VA

Hospitals and healthcare facilities: nosocomial infections and chemical surveys

- Community hospital, facility water intrusion, San Bernardino County, CA
- Research hospital, Legionella & CCR Title 22 water quality survey. Los Angeles, CA
- Community hospital, Legionella & CCR Title 22 water quality survey, Simi Valley, CA
- Community hospital, 2-year construction project, Redlands, CA
- Research hospital, nosocomial infections, Los Angeles, CA
- 80-bed elderly health care facility, mold remediation, Claremeont, CA
- Research hospital, construction project, Los Angeles, CA

Assessment of exposure hazards in the workplace, the home, and the environment

- Wildfire smoke, residential properties, Bastrop, TX
- Contents, US Air Flight 1549 ["Miracle on the Hudson"], Ft. Worth, TX
- Research hospital, exposure compliance sampling, Los Angeles, CA
- CDC/ATSDR, Atlanta, GA.: Performed health assessments on populations living near Superfund sites in the western US
- Developed and implemented an exposure assessment program for chemical, physical, and biological hazards in ten regional US EPA laboratories
- Residential Initiative on Indoor Air Quality: Manager, US EPA
- Combustion Toxicology Laboratory: Manager, FAA Research Center
- Lead Paint Poisoning Program: Research Chemist, NBS/NIST

PROFESSIONAL WORK EXPERIENCE

Joe Spurgeon dba Bayshore Environmental; Tifton, GA; Consultant, microbial indoor air quality and wildfire smoke residues

Bayshore Environmental, Inc.; Placentia, CA.; Consultant, microbial indoor air quality and wildfire smoke residues

Pacific Health & Safety, Inc.; Irvine, CA; Manager of Microbial Services; residential and commercial

US Public Health Service, Division of Federal Occupational Health; Washington, DC; Contract Consultant, CIH; major IAQ investigations and EPA Laboratory Exposure Assessment Program

US Environmental Protection Agency, Indoor Air Division; Washington, DC.; Project Manager: Residential Initiative on Indoor Air Quality; Environmental Scientist

Centers for Disease Control and Prevention, Agency for Toxic Substances & Disease Registry, Atlanta, Ga.; Division of Health Assessment & Consultation; Environmental Health Scientist

Social Security Administration, Baltimore, Md.; Division of Environmental Protection and Safety, Environmental Protection and Safety Branch; Senior Industrial Hygienist

Baywind Associates, Inc.; Baywinds Realty, Inc., Chesapeake, VA; licensed Class A general contractor, residential builder

Bayshore Environmental Laboratory, Inc., Chesapeake, VA; Asbestos laboratory; consultant in asbestos and lead-based paint

Federal Aviation Administration (DOT), National Technical Center, Atlantic City, N.J.; Aircraft Safety Division, Fire Safety Branch; Manager, Combustion Toxicology Laboratory.

National Institutes of Science & Technology (NBS), Gaithersburg, Md.; Lead Paint Poisoning Program; Research Chemist; internal consultant to HUD on toxic metals in coatings

BOOKS

Using Airborne Mold Spores to Assess The Condition of Indoor Air: Guidelines for Assessing Building-related Contamination and Occupant Exposure Potential; Joe C. Spurgeon; www.expertonmold.com , Dec., 2018.

Interpreting Mold Samples: A Workbook of Example Projects; Joe C. Spurgeon; www.expertonmold.com , May, 2017.

Toxic Mold in Your Home: A Guide for Consumers; Joe C. Spurgeon, www.expertonmold.com , August, 2015.

The Collection and Interpretation of Indoor Mold Samples: A Comparison of Methods; Joe C. Spurgeon; www.expertonmold.com , May, 2015.

ADDITIONAL TRAINING

Toxicology:

Inhalation Toxicology (Lovelace Research Institute)
Toxicology of Heavy Metals (Univ of North Dakota)
Essentials of Toxicology (NIH/NCI Graduate School, Bethesda, MD)

Exposure Assessments:

Risk Assessment Symposium; AIHA, Nashville, TN
Risk Assessment Methods: A Tool Box; AIHA, PDC # 442
Workplace Exposure Assessment (Workbook) ; PDC # 440, Atlanta, GA.
Exposure Assessment Strategies and Statistics; AIHA PDC # 702, Houston, TX
Basic Exposure Assessment Modeling; UNC/AIHA Summer Institute, Norfolk, VA
Intermediate Exposure Assessment Modeling; UNC/AIHA Summer Institute, Norfolk, VA

Laboratory Analysis of Fungal Spores:

Advanced Microscopic Identification of Fungal Spores (McCrone)
Identification of Cultured Fungi (McCrone)
Intermediate Microscopic Identification of Fungal Spores (McCrone)
Introductory Identification of Fungal Spores (McCrone)

Indoor Air Quality Courses:

Construction Failure Investigations (RestCon)
Building Sciences Clinic (Lstiburek, Straube)
Statistical Methods for Mold Air Sampling Data (AIHA)
Air Sampling for Mold - A Litigation Perspective (AIHA)
Moisture Control In Construction (Lstiburek)
Investigating and Assessing Microbiological Contamination in the Indoor Environment
Developing Remediation Strategy and Writing Specifications for Mold Abatement
Microbial IAQ Problems in Hot and Humid Climates
Strategies for Conducting Microbial IAQ Investigations (AIAQC)
Microorganisms in Indoor Air (AIHA)
Aerobiology of Indoor Environments (Harvard)
Microbiological Procedures for Indoor Air Quality Surveys (MAEHRC)
Microbiological Sampling and Assessment of Indoor Environments (MAEHRC)
Advanced Instrumentation and Sampling Methodology for IAQ (MAEHRC)
Reading and Understanding Blueprints from an IAQ Perspective (MAEHRC)
HVAC System Performance and Indoor Air Quality (MAEHRC)
How to Conduct an Indoor Air Quality Investigation (AIHA)

Health Care Facility Courses

EH&S for Healthcare, PDC 404, AIHce, Philadelphia, PA (06-03-07)

Indoor Air Quality Conferences:

23rd IAQA Conference & Exposition, W Palm Beach, FL, Feb, 2020
Health Buildings Summit, Seven Springs, PA, Oct., 2019
Health Buildings Summit, Seven Springs, PA, Oct., 2018
Health Buildings Summit, Seven Springs, PA, Oct., 2016
19th IAQA Conference & Exposition, Orlando, FL, Jan, 2016
Health Buildings Summit, Seven Springs, PA, Oct., 2015
18th IAQA Conference & Exposition, Grapevine, TX, May, 2015
SLOAN Conference: Microbiology of the Built Environment, Boulder, CO, June, 2014
17th IAQA Conference & Exposition, Nashville, TN, March, 2014
16th IAQA Conference & Exposition, Orlando, FL, March, 2013
11th International Conference on IAQ and Climate; ISIAQ, Austin, TX; June, 2011
American Industrial Hygiene Association Conference; Portland, OR; May, 2011
American Industrial Hygiene Association Conference; Denver, CO; June, 2010
American Industrial Hygiene Association Conference; Minneapolis, MN; June, 2008
UCLA; Mold: Current State of the Medical and Environmental Science 2008; 02/26-28/08

American Industrial Hygiene Association Conference; Philadelphia, PA; June, 2007
ASTM Conference: Bringing Science to Bear on Moisture and Mold in the Built Environment; Boulder, CO; July, 2006
American Industrial Hygiene Association Conference; Chicago, IL; May, 2006
American Industrial Hygiene Association Conference; Anaheim, CA; May, 2005
American Industrial Hygiene Association Conference; Atlanta, GA; May, 2004
Mold Remediation: The Quest for National Consensus, ACGIH, Orlando, FL; Nov., 2003
5th International Conference on Bioaerosols; Saratoga Springs, N.Y., Sept., 2003
Environmental Mold Symposium; AIHCE, Dallas, TX, May, 2003
Indoor Air Quality Symposium; AIHCE, Dallas, TX, May, 2003
American Industrial Hygiene Association Conference; Dallas, TX, May, 2003
9th International Conference on IAQ and Climate; ISIAQ, Monterey, CA, June, 2002
American Industrial Hygiene Association Conference; San Diego, CA, May, 2002
Indoor Air Quality Conference; AIAQC, Orlando, FL, April, 2002

ASBESTOS LICENSES AND TRAINING (not current)

Abatement Supervisor; Project Designer; Project Monitor; Inspector/Management Planner
NIOSH 582: Microscopy of Airborne Asbestos Samples;
McCrone PLM: Microscopy of Bulk Asbestos Samples.

INSTRUCTOR

- Sampling and Characterizing Wildfire Smoke Residues, Webinar, CIRI, November 17, 2021
- Assessing Indoor Environments for Mold; IAQ Training Institute, Greenville, SC, June 27, 2021
- Assessing Indoor Environments for Mold; Health Buildings Summit, 7 Springs, PA, Oct. 2019
- Assessing Indoor Environments for Mold; IAQ Training Institute, Greenville, SC, Dec. 12, 2019
- An Advanced Course in Assessing Indoor Mold; IAQTI, Greenville, SC, May 9, 2019
- Interpreting Mold Samples: A Workbook; IAQ Training Institute, Richmond, VA, Dec. 6, 2017
- Methods for Interpreting Airborne Mold Samples; IAQA Webinar Series, May 18, 2016
- The Collection and Interpretation of Indoor Mold Samples (# 18256), IAQA Expo, Jan, 2016
- A Comparison of Sampling and Data Interpretation Methods for Mold, IAQA Expo, May, 2015
- Sampling and Data Interpretation Methods for Mold: An Advanced Course, IAQA, March, 2014
- Using qPCR in Mold Investigations, IAQA Workshop, Santa Ana, CA, November 8, 2008.
- Elements of a Residential Mold Investigation, IAQA Workshop, Fremont, CA, June 21, 2006.
- Sampling Methods for Mold, IAQA Workshop, Fremont, CA, June 21, 2006
- Conducting Mold Investigations as Exposure Assessments; J. Spurgeon, F. Wu., AIHce, PDC # 408, Chicago, IL; May 14, 2006.
- How One Expert Witness Conducts Mold Investigations; J. Spurgeon, F. Wu. Environmental Information Association Conference, Phoenix, AZ, March 25, 2006.
- An Overview of Sampling Methods for Fungal Contaminants; AIAQC Workshop; Skirball Center, Los Angeles, CA; July 16, 2003.
- Inspection and Sampling of Residential Properties for Mold and Allergens; Santa Ana, CA, December 12-14, 2002; April 17-19, 2003; Fullerton, CA, July 25-26, 2003 [CRMI Certification]
- How One Expert Witness Conducts Mold Investigations; J. Spurgeon. Environmental Information

Association Conference, Savannah, GA, March 23, 2003.
- An Exposure Assessment Strategy for Laboratories; AIHce, PDC # 301, Orlando, FL., 2000.
- Asbestos Abatement Worker/Supervisor Course; EPA approved, 1990 - 93.
- Lead-paint Abatement Worker/Supervisor Course; 1990 - 93.
- Investment Real Estate; Century 21 Real Estate of the Mid-Atlantic States, 1984 - 89.

PEER REVIEWED PUBLICATIONS

Spurgeon J, Seif F, Mirika E; A comparison of the Wet Wipe and Tape Lift methods for Sampling Surface Char in Residential Properties Impacted by Wildfire Smoke; The Journal of Cleaning Science, Fall (16-24), 2021.

Spurgeon, J.; Research to Practice: Methods for Assessing Mold-Contaminated Soft Surfaces; Cleaning Science Quarterly, Vol 1(2), 2019.

Spurgeon, J.; Post-Restoration Verification of Wildfire Smoke Contaminants; J. Cleaning, Restoration and Inspection, 28-34, Winter, 2017.

Spurgeon, J.; An Examination of Sampling Methods for Assessing the Conditions of Carpets and Soft-Surface Items; Journal of IICRC, 3(2):20-27, 2016.

Spurgeon, J.; A Comparison of Replicate Field Samples Collected with the Bi-Air, Air-O-Cell, and Graesby-Andersen N6 Bioaerosol Samplers; Aerosol Science & Technology, 41(7):761-769, 2007.

Spurgeon, J.; A New Filter Cassette for the Direct Microscopic Examination of Airborne Fungal Spores; Aerosol Science & Technology, 40(11):1025-1033, 2006.

Spurgeon, J.; A Sampling Method for Comparing Fungal Concentrations in Carpets; AIHAJ, 64(6):842-845), Nov/Dec, 2003.

Spurgeon, J.; A Method for Detecting Fungal Contaminants in Wall Cavities; AIHAJ, 64(1):40-47, Jan/Feb., 2003.

PEER REVIEWED TECHNICAL PRESENTATIONS

Post-Remediation Sampling for Wildfire Smoke Contaminants. J. Spurgeon; IAQA Expo, Presentation 18284, Jan 24-27, 2016, Orlando, FL.

Criteria for Assessing Building Contamination and Occupant Exposure. J. Spurgeon; IAQA Expo, Presentation 18263, Jan 24-27, 2016, Orlando, FL.

An Opinion on the Quality of Mold Data. J. Spurgeon; Sloan Conference: Microbiology of the Built Environment; Univ of Colorado; June 6, 2014.

A New Method for Detecting Low Concentrations of Airborne *Aspergillus* in HEPA Filtered Hospital Air. J. Spurgeon, K. Lin, G. Spahr; ISIAQ, Paper 270, June 7, 2011, Austin, TX.

A comparison of The Air-O-Cell Slit Impaction Cassette and Bi-Air Filter Cassette for the Collection of Total Airborne Fungal Spores. J. Spurgeon; AIHce 2008, PO 128,, June 4, 2008, Minneapolis, MN

Differentiating between Clean and Moldy Indoor Environments Based on Airborne *Asp/Pen* Spore Concentrations. J. Spurgeon, D. Bridge, M. Krotenberg; AIHce 2008, PO 128, June 4, 2008, Minneapolis, MN

Concentrations of Airborne *Asp/Pen* Spores in Critical Care Areas of Hospitals as Measured by Spore Counts and qPCR. J. Spurgeon, K-T Lin, G. Spahr; AIHce 2008, PO 110, June 2, 2008, Minneapolis, MN

Interpreting indoor Concentrations of Airborne Mold; J. Spurgeon; Session: Mold Exposure Assessment and Evaluation: PO 104, Paper 26; AIHCE, Anaheim, CA, May 23, 2005.

Field Performance of the Bi-Air Cassette for Collecting Airborne Mold Spores; J. Spurgeon; Indoor Air Quality: PS-404, Paper 307; AIHCE, Anaheim, CA, May 24, 2005.

A Method for Sampling Fungal Contaminants in Carpets and Soft Surfaces; J. Spurgeon; Mold Sampling Methods, Podium Session 122, Paper 156; AIHCE, Dallas, TX, May 14, 2003.

A Method for Collecting TWA Samples of Airborne Fungi and Fungal Spores; J. Spurgeon; Mold Sampling Methods Podium Session 122, Paper 159; AIHCE, Dallas, TX, May 14, 2003.

A Method for Sampling Fungal Spores and Culturable Fungi in Wall Cavities: J. Spurgeon; PS 401, Paper 247; AIHCE, Dallas, TX, May 12, 2003.

Analysis of Bioaerosol Data Using Exposure Assessment Statistics; J. Spurgeon. Roundtable 249: Forum on Bioaerosol Sampling; AIHCE, Orlando, FL., May 25, 2000.

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05. Rosario Perry (Law Offices) **[Defense]**
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Jonathan Chodos, Attorney; Los Angeles, CA

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Ball, Ghaleb & Hulbert, Pasadena, CA

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Law Offices of Faryan A. Afifi, Los Angeles, CA

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Rodiger Law Firm, Pasadena, CA

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Blackmon v. Landmark Equity Management
Superior Court of California, County of Los Angeles, Central Branch, Case No. BC298643
Margaret Elder; Watten, Dsicoe, Bassett & McMains, Santa Ana, CA

26. April 30, 2004
Winthrop, Stuart & Elizabeth v. Golden Eagle Insurance
Superior Court of California, County of Santa Barbara; Case No. 01128946
Dennis Jones; Myers, Widders, Gibson Jones, Ventura, CA

25. March 6, 2004
[David Fifield] Andrew Madden v. Irene Doss
Superior Court of California, County of Orange, Central Justice Center, Case No. 03CC05570
Court Purdy; Wentworth, Paoli & Purdy, Irvine, CA

24. January 30, 2004
Von Jaffe v. State Farm General Insurance
Superior Court of the State of California, County of San Diego, Case No. GIC 802179
William J. Brown, Attorney; Encinitas, CA 92023

23. January 27, 2004
Tarbet, Elizabeth
Superior Court of the State of California, County of San Diego
Patrick Catalano, Attorney, San Diego, CA

22. January 7, 2004
Hickey, Michael v. So. Cal. Edison
The David Epstein Law Firm, Laguna Beach, CA

21. December 4, 2003
David & Pam Sprowl v. Racquet Club Villa HOA
Superior Court of the State of California, County of Ventura, East County division, Case No.: SC 031711

20. November 24, 2003
Ruby M. Fajardo v. Dr. Amir Haghihatoo et al
Superior Court of the State of California, County of Los Angeles
Raj D. Roy & Associates, 8345 Reseda Blvd., Suite 222, Northridge, CA 91324

19. November 19, 2003
Gary Wuttke v. Las Brisas Association
Superior Court of the State of California, County of Santa Clara, Case CV-775118
Joseph Carcione, Jr.; Law Offices of Joseph W. Carcione, 601 Brewster St., Redwood City, CA

18. May, 2003 - December, 2003
Olga Salinas & Martin Villareal v. Allstate Texas Lloyd's Company
United States District Court, Southern District of Texas, McAllen Division, Civil Action # M-02-272
Trey Hendersen; Doyle, Restrepo, Harvkin & Robbins LLP, 600 Travis, Houston, TX

17. September 2, 2003

Joe Spurgeon

Mehrdad Saghian and Stephanie Jarin v. Liza Minnelli **[Defense]**
Superior Court of CA, County of Los Angeles, Dept. 46, LASC No. 03-1123-EC
Law Offices of William Kerr, 23805 Stuart Ranch Rd., # 115, Malibu, CA 90265

16. August 26, 2003
Colette D. Daniels v. The Andreessen 1996 Living Trust et al.
Superior Court of California, County of Los Angeles, West District, Case No. SC 069221
James Fogelman, Gibson, Dunn & Crutcher LLP,
333 S. Grand Ave., Suite 4700, Los Angeles, CA 90071

15. August 07, 2003
Robert Small, et al v. Gary Cox, et al
Superior Court of California, County of Los Angeles, Case No. VC 036601
Michael D. West, Morris, Polich & Purdy LLP, 10866 Wilshire Blvd., Suite 1400, Los Angeles, CA

14. July 31, 2003
Jay & Teri Chavkin vs. Mercury Casualty Company et al.
Superior Court of California, County of Los Angeles, Central Branch, Case No. BC 275831
John V. Hagar, Hagar & Dowling, 20750 Ventura Blvd., Suite 410, Woodland Hills, CA 91367

13. July 11, 2003
Petrik vs. Interamerican Builders, etc., et al **[Defense]**
Superior Court of California, County of Orange, Complex Justice Center, Case No. 795037
Mahaffey & Associates, 3090 Bristol Street, Suite #100, Cosa Mesa CA 92626

12. June 20, 2003
Johnson vs. CZ Master Association and Richard Licon
Superior Court of the State of California, County of Orange, Central Justice Center, Case # 01CC05988
Callahan & Blaine, Attorneys At Law, 3 Hutton Centre Drive, Suite 900, Santa Ana, CA

11. Hennelly & Grossfeld, LLP
Kelley vs. Lido Resort Homes, LLC et al
Deposition Date: March 07, 2003
Superior Court of the State of California, County of Orange, Central Justice Center, Case # 02CC03435

10. Law Offices of Howard, Loveder, Stickroth & Parker
Carl & Joanne McGinn vs. Sharon & Jerry Kania,
Superior Court of Orange County, Case# 01CC16003
Deposition Date: January 14, 2003

09. Haight, Brown & Bonesteel, LLP
Lefler, et al v. Verboon, Whitaker & Peter, LLP, et al
Superior Court of the State of California, County of Los Angeles–West Branch, Case # SC 068540
Deposition Date: January 8, 2003

08. Law Offices of Timothy J. Gray - Timothy J. Gray **[Defense]**
Bonetati & Kincaid - Jeffry J. Dicks (for the Respondent); November 18 & 25, 2002
Parke Victoria HOA vs. Chris Cobb Construction Services, Inc.; Case # 80E 110 00344 00 JLJ

07. Santos, et al. v. McCoy. Et al.; Oct. 24 & Oct. 28, 2002
McNicholas & McNicholas, Los Angeles, CA

06. Jonathan S. Vick (Robertson, Vick & Capella, LLP)
LaRosa vs. D.R. Horton; Case # 00CC06888; September 11, 2002

Joe Spurgeon

05. Bob Bichler (Robert F. Brennan, Esq.)
Williams vs. JMV Construction, et al.; Case # PC028113X; August 23, 2002

04. John F. Murphy & Associates
James Presley vs. Chi Properties; Case # YC041457; August 13, 2002

03. David A. Wankel, Esq. (Law Offices of L. Scott Karlin)
David Coy & Julieta Coy vs. Sunhollow Homeowners Assoc, et al; July 30, 2001

02. Brad Landon (Dougherty & Landon)
Rita & Edward DaCorsi vs. Costain Homes, Inc.; June 18, 2002
Superior Court of California, County of Ventura, East County Division, Case # SC 028870

01. Jeffery A. Milman (Lopez, Hodes, Restaino, Milman, Skikos & Polos)
Fleener, et al. vs. Kidrat, et al.; April 30, 2002
Superior Court of California, County of Orange, Case # 01 CC 01932

Appendix C

Professor Rene Salazar C.V.

CURRICULUM VITAE

René R. Salazar

PERSONAL

Birthplace: Tampa, Florida

Contact Information:

Personal	Work
6607 Heatherton Court	13201 Bruce B. Downs Boulevard
Tampa, Florida 33617	MDC56 (Office No. NEC307)
Phone: (813) 748-6634	Phone: (813) 974-9623
Fax: (813) 989-0269	Fax: (813) 974-4986
rsalazar@salazarconsultinggroup.com	rsalaza5@health.usf.edu

HIGHER EDUCATION

Bachelor of Arts	Microbiology University of South Florida, 1978
Master of Public Health (MPH)	Industrial Hygiene & Safety Management University of South Florida, 1991
Doctor of Philosophy (Ph.D.)	Industrial Hygiene & Safety Management University of South Florida, 1997

AWARDS AND HONORS

Tau Chapter of Delta Omega, University of South Florida College of Public Health
Phi Kappa Phi Honor Society, University of South Florida
Graduation Cum Laude, University of South Florida
Phi Theta Kappa Honor Society, Hillsborough Community College
Graduation with Honors, Hillsborough Community College

EMPLOYMENT

Current:

July, 2011 to present	Assistant Professor University of South Florida College of Public Health Department of Environmental/Occupational Health Tampa, Florida

July, 1999 to present	President Salazar Consulting Group, Inc. *(formerly Salazar & Spaul Environmental Consultants, Inc.)* Tampa, Florida

Previous:

Spring, 1998 to July, 2011	Adjunct Assistant Professor University of South Florida College of Public Health Tampa, Florida
October, 2010 to February, 2011	Principal Consultant ENVIRON International Corporation Tampa, Florida
January, 2010 to May, 2010	Adjunct Professor University of Tampa Tampa, Florida
August, 1997 to August, 1999	Senior Health Scientist Chastain-Skillman, Inc. Tampa, Florida
January, 1995 to July, 1997	Senior Industrial Hygienist Chastain-Skillman, Inc. Tampa, Florida
January, 1993 to December, 1994	Industrial Hygienist Chastain-Skillman, Inc. Tampa, Florida
September, 1992 to December, 1992	Research Assistant Department of Environmental and Occupational Health University of South Florida, College of Public Health Tampa, Florida
September, 1991 to April, 1992	Laboratory Manager Department of Environmental Health University of Alabama at Birmingham, School of Public Health Birmingham, Alabama
May, 1991 to September, 1991	Research Assistant Department of Environmental and Occupational Health University of South Florida, College of Public Health Tampa, Florida
May, 1990 to April, 1991	Graduate Assistant Department of Environmental and Occupational Health University of South Florida, College of Public Health Tampa, Florida

December, 1989 to May, 1990	Director of Technical Services Southern Mill Creek Products, Inc. Tampa, Florida
July, 1985 to November, 1989	Owner Dyzar Lawn Care Tampa, Florida
March, 1983 to July, 1985	Director of Technical Services Treasure Isle, Inc. Dover, Florida
June, 1978 to March, 1983	Food Technologist/Production Supervisor Kraft, Inc. Lakeland, Florida

CERTIFICATIONS

Certified Industrial Hygienist
State of Florida Mold Assessor
AHERA Asbestos Inspector
AHERA Asbestos Management Planner
Association of Energy Engineers Certified Indoor Air Quality Professional

PROFESSIONAL ORGANIZATION MEMBERSHIPS

American Industrial Hygiene Association
American Academy of Industrial Hygienists
American Industrial Hygiene Association-- Florida Section
Florida Public Health Association

CONSULTATION AND COMMITTEE ASSIGNMENTS

2006 to present	American Industrial Hygiene Association Full Member Emerging Infectious Diseases Project Team Biosafety and Environmental Microbiology Committee
2005 to present	American Industrial Hygiene Association Full Member Biosafety & Environmental Microbiology Committee
2002 to present	American Industrial Hygiene Association Full Member Indoor Environmental Quality Committee

2005 to 2011	University of South Florida College of Public Health Sunshine Education and Research Center Chair External Advisory Committee
2000 to 2002	American Industrial Hygiene Association Member Environmental Microbiology Laboratory Accreditation Committee
2000 to 2002	American Industrial Hygiene Association Member Environmental Microbiology Laboratory Education Sub-Committee
September, 2000 to September, 2005	Tampa Area Safety Council Member Board of Directors – Executive Committee
1999 to 2000	Honeywell, Inc. Member Physician Advisory Board
1999 to 2000	American Lung Association of Gulfcoast Florida Chair: Air Quality Task Force Health House Subcommittee
1998 to 2005	American Industrial Hygiene Association Corresponding Member Biosafety and Environmental Microbiology Committee
1998 to 2001	American Industrial Hygiene Association Corresponding Member Indoor Environmental Quality Committee
1998 to 2002	American Lung Association of Gulfcoast Florida Member Air Quality Task Force
1997 to 1999	Center for Indoor Air Research Peer Reviewer
1995 to 1997	University of South Florida/Chastain-Skillman, Inc. Member Training Consortium - Planning Committee
1992	University of Alabama at Birmingham Vice President School of Public Health Student Council

COMMUNITY SERVICE

December 6, 2011	Science Fair Judge Lewis Elementary School Tampa, Florida
November 18, 2011	"The Work of an Industrial Hygienist" Great American Teach-In Brooks-DeBartolo Collegiate High School (Three Sessions) Tampa, Florida
November 17, 2011	"The Work of an Industrial Hygienist" Great American Teach-In Lewis Elementary School (Two Sessions – 2nd/5th Grades) Tampa, Florida
November 21, 2008	"Industrial Hygiene: *An Exciting Career Protecting People in the Workplace and the Community*" Great American Teach-In Terrace Community Middle School Tampa, Florida
November 19, 2008 and November 16, 2005	"Hispanic Kites: How to Make One" Great American Teach-In Lewis Elementary School Tampa, Florida
November 14, 2007	"Paper Crafts, Magic, and Games" Great American Teach-In Lewis Elementary School Tampa, Florida
November 15, 2006	"Building Paper Airplanes" Great American Teach-In Lewis Elementary School Tampa, Florida
October 10, 2006	"Presidents as Principals" Program Lewis Elementary School Tampa, Florida
November 17, 2004	"What is an Industrial Hygienist?" Great American Teach-In Lewis Elementary School Tampa, Florida
August 7, 2003	"The Mold Scare: Separating Fact from Fiction" Land O' Lakes Realtors Association Land O' Lakes, Florida

August 2002 to present	Business Partner Lewis Elementary School Tampa, Florida
February 16, 1999, May 21, 1998, and February 18, 1997	"Indoor Air Quality Management Techniques" National Safety Council - Tampa Chapter Tampa, Florida
July 15, 1998	"Occupational Health Hazard Evaluation Techniques" Governor's Summer Program University of South Florida College of Public Health Tampa, Florida
February 13, 1996	"Evaluating Indoor Environments for Chemical and Biological Contamination" National Safety Council - Tampa Chapter Tampa, Florida
February 23, 1995	"Indoor Air Quality Evaluation Techniques" National Safety Council - Tampa Chapter Tampa, Florida
November 19, 1993	"What is an Industrial Hygienist?" Great American Teach-In Ruskin Elementary School Ruskin, Florida

PRESENTATIONS

July 11, 2012	"Health and Safety Issues at a Zoo" Lowry Park Zoo Tampa, Florida
April 23, 2012	"Safe Food and Water" University of Tampa Tampa, Florida
December 5, 2011	"Working Toward a Healthy Environment" University of Tampa Tampa, Florida
November 28, 2011	"Safe Food and Water" University of Tampa Tampa, Florida
April 13, 2011	"Safety of Food and Water" University of Tampa Tampa, Florida

April 12, 2011	"Working Toward a Healthy Environment" University of Tampa Tampa, Florida
March 24, 2011	"Higher Education in Environmental and Occupational Health" University of Tampa Tampa, Florida
March 21, 2011	"Preparing for Employment in the Environmental/Occupational Health Field" University of South Florida College of Public Health Tampa, Florida
November 29, 2010	"Safety of Food and Water" University of Tampa Tampa, Florida
November 29, 2010	"Working Toward a Healthy Environment" University of Tampa Tampa, Florida
November 15, 2010	"Biological Agents of Occupational Importance" University of South Florida College of Public Health Tampa, Florida
September 27, 2010	"Preparing for Employment in the Environmental/Occupational Health Field" University of South Florida College of Public Health Tampa, Florida
September 13, 2010	"Everything Changes ….. *Evolution of a Globally Harmonized System of Classification and* Labeling" University of South Florida College of Public Health Tampa, Florida
May 14, 2010	"Indoor Environmental Quality …..*basic concepts*" University of South Florida College of Public Health Tampa, Florida
November 16, 2009	"Working Toward a Healthy Environment" University of Tampa Tampa, Florida
November 5-6, 2009	"Comparison of Methods Utilized by Commercial Laboratories for Analyses of Bulk Drywall Samples" Technical Symposium on Corrosive Imported Drywall Tampa, Florida

November 5-6, 2009	"Results of Indoor Air Testing in Two Homes Experiencing Copper Corrosion Associated with Corrosive Imported Drywall" Technical Symposium on Corrosive Imported Drywall Tampa, Florida
November 3, 2009	"Timely Topics in Environmental and Occupational Health" West Coast Regional Case Management Association Tampa, Florida
October 13, 2009	"Biological Agents of Occupational Importance" University of South Florida College of Public Health Tampa, Florida
September 14, 2009	"The Human Body: A Nutrition Perspective" University of Tampa Tampa, Florida
April 17, 2009	"Working Toward a Healthy Environment" University of Tampa Tampa, Florida
February 2, 2009	"The Human Body: A Nutrition Perspective" University of Tampa Tampa, Florida
November 14, 2008	"Working Toward a Healthy Environment" University of Tampa Tampa, Florida
October 13, 2008	"Biological Agents of Occupational Importance" University of South Florida College of Public Health Tampa, Florida
May 27, 2008	"Biological Agents of Indoor Environments" University of South Florida College of Public Health Tampa, Florida
October 15, 2007	"Biological Agents of Occupational Importance" University of South Florida College of Public Health Tampa, Florida
August 15, 2007	"The Mold Crisis ….. *an Update on Current Thoughts and Practices*" American Association of Occupational Health Nurses Webcast Tampa, Florida
October 30, 2006	"Biohazards of the Workplace" University of South Florida College of Public Health Tampa, Florida

June 28, 2006	"Recognition, Evaluation and Control of Non-Mold Exposures of the Work Environment" University of South Florida College of Public Health Environmental Research Center
June 27, 2006	"Biological Agents of Indoor Environments" University of South Florida College of Public Health Tampa, Florida
March 8, 2006	"Investigating an Occupationally-Related Mold Exposure Case" University of South Florida College of Public Health Environmental Resource Center Tampa, Florida
February 22, 2006	"Mold … and Its Effects on the Construction Industry" University of South Florida College of Public Health Environmental Resource Center Tampa, Florida
February 13, 2006	"Indoor Environmental Quality" National Occupational Research Agenda – Town Hall Meeting University of South Florida Tampa, Florida
November 17, 2005	"Biological Agents of Occupational Importance" University of South Florida College of Public Health Tampa, Florida
November 10, 2005	"Biological Agents of Indoor Environments" University of South Florida College of Public Health Tampa, Florida
October 11, 2005	"Mold: Evaluation, Recognition, and Control" Sarasota County School District Sarasota, Florida
September 13-14, 2005	Mold Awareness Training Course National Aeronautics & Space Administration (NASA) Marshall Space Flight Center Huntsville, Alabama
June 28, 2005	"An Industrial Hygiene Approach to Mold Assessment and Control" University of South Florida College of Public Health Tampa, Florida
May 6, 2005	"Indoor Environmental Quality" "The Mold Scare: Facts and Myths" "Facilities Management Strategies to Optimize Indoor Environmental Quality" Pinellas County School District Saint Petersburg, Florida

November 8, 2004	"Mold: Evaluation, Recognition, and Control" National Aeronautics & Space Administration (NASA) Kennedy Space Center Titusville, Florida
November 11, 2004	"Biological Agents of Occupational Importance" University of South Florida College of Public Health Tampa, Florida
October 7, 2004	"The Mold Scare: Facts & Myths" University of South Florida College of Public Health Tampa, Florida
September 16, 2004	"Fungi and Indoor Environmental Quality" University of South Florida College of Public Health Tampa, Florida
June 30, 2004	"Mold: An Industrial Hygienist's Perspective" University of South Florida College of Public Health Sunshine Environmental Research Center Tampa, Florida
June 29, 2004	"Biological Agents of Indoor Environments" University of South Florida College of Public Health Tampa, Florida
June 9, 2004	"General Indoor Environmental Quality Assessments" University of South Florida College of Public Health The Sunshine ERC Tampa, Florida
June 4, 2004	"General Indoor Environmental Quality Assessments" University of South Florida College of Public Health Sunshine Environmental Resource Center
May 26, 2004	"Moving Beyond Indoor Environmental Quality: Recent Advancements and New Approaches" Hillsborough County Bar Association Tampa, Florida
April 28, 2004	"Mold: Evaluation, Recognition and Control" National Aeronautics & Space Administration (NASA) Stennis Space Center Bay St. Louis, Mississippi
April 21, 2004	"Mold….and the Building Industry" Hannah Bartoletta Homes Lutz, Florida

July 3, 2001	"Control of Biological Agents in Industrial and Non-Industrial Environments" University of South Florida College of Public Health Tampa, Florida
June 4-6, 2001	"Exposures to Petroleum Distillates and Naptha During Aerial Pesticide Application Activities" American Industrial Hygiene Conference and Exposition New Orleans, Louisiana
April 20, 2001	"Microbial Contamination Assessment Techniques" Mark of Excellence, Inc. Tampa, Florida
March 30, 2001	"Recognition and Evaluation of Indoor Biological Contaminants" Environmental Health Services - Kennedy Space Center Titusville, Florida
March 27, 2001	"Preventing Exposures to *Legionella*" "Recognition and Evaluation of Indoor Biological Agents" University of South Florida Energy Technology Resource Center Tampa, Florida
January 17, 2001	"Indoor Environmental Quality" University of South Florida College of Public Health Tampa, Florida
October 19, 2000	"Current Issues in Indoor Environmental Quality" Risk and Insurance Management Society – Tampa Bay Chapter Tampa, Florida
August 31, 2000	"Role of Volatile Organic Compounds (VOC's) in Indoor Environmental Quality" University of South Florida College of Public Health Tampa, Florida
June 8, 2000	"Microbial Contamination Assessments" Mark of Excellence, Inc. Tampa, Florida
May 20-25, 2000	"Collection and Analyses of Mycotoxins from Indoor Environmental Substrates: Potential Interferences and the Role of Spiked Samples" American Industrial Hygiene Conference and Exposition Orlando, Florida
May 3, 2000	"Indoor Environmental Quality Assessment Strategies" Veterans Administration Hospital – Employee Retreat Daytona Beach, Florida

April 24 and September 21, 2000	"Biological Agents of Indoor Environments" University of South Florida College of Public Health Tampa, Florida
October 28, 1999	"Evaluating Adverse Health Outcomes Associated with Indoor Exposures to *Stachybotrys chartarum*" National Institute of Occupational Safety and Health Morgantown, Virginia Tampa, Florida
March 19, 1999	"Assessment and Control of Biological Agents Encountered During Cleaning and Restoration Activities" Mark of Excellence, Inc. Tampa, Florida
August 25, 1998	"Tuberculosis and Hepatitis B Awareness Training" Home Therapy Products Jacksonville, Florida
April 9, 1998	"Lead-Based Paint Awareness Training" University of South Florida College of Public Health Tampa, Florida
October 20, 1997, January 11, 1996, June 26, 1995, and June 9, 1994	"Principles of Noise Analysis and Control" Audiometric Testing and Hearing Conservation Training Occupational Marketing, Inc. Tampa and Clearwater, Florida
June 3, 1997	"Bioaerosols, Immunogenic Agents, and Related Health Effects" "Elements of an IAQ Investigation: What to Look For" Sprint Communications Apopka, Florida
November 25, 1996	"Occupational Exposure to Bloodborne Pathogens and Tuberculosis: Development and Implementation of a Worksite Prevention Program" University of South Florida College of Public Health Tampa, Florida
August 26, 1996	"Principles of Industrial Hygiene: An Introduction" University of South Florida College of Public Health Tampa, Florida
August 15, 1996	"A Proactive Approach to Managing Indoor Air Quality: Guidelines for HVAC Personnel" Hillsborough County Public Schools Tampa, Florida

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June 5, 1996	"Principles of Noise Analysis and Control" Audiometric Testing and Hearing Conservation Training University of Alabama at Birmingham Deep South Center for Occupational Health and Safety Tampa, Florida
February 6 - 7, 1996	"A Proactive Approach to Managing Indoor Air Quality: Guidelines for Custodial Personnel" Hillsborough County Public Schools Tampa, Florida
January 10, 17, and 22, 1996	"A Proactive Approach to Managing Indoor Air Quality: Guidelines for Principals" Hillsborough County Public Schools Tampa, Florida
November 29, 1995	"Confined Space Training" University of South Florida College of Public Health Tampa, Florida
November 27, 1995	"Prevention of Occupational Exposure to Bloodborne Pathogens and Tuberculosis" University of South Florida College of Public Health Tampa, Florida
November 15, 1995	"Bloodborne Pathogens/Tuberculosis Training" University of South Florida College of Public Health Tampa, Florida
November 1, 1995	"Indoor Air Quality Training" University of South Florida College of Public Health Tampa, Florida
May 23, 1995	"Assessment of Indoor Biological Contamination" Occupational Health Lecture Series University of South Florida College of Public Health Tampa, Florida
March 1, 1995	"Analytical Methods in Industrial Hygiene: Sampling for Particulates and Total/Respirable Dust" University of South Florida College of Public Health Tampa, Florida
December 16, 1994	"Bloodborne Pathogens/Tuberculosis Training" Hillsborough County School Board Tampa, Florida
December 2, 1994	"Bloodborne Pathogens/Tuberculosis Training" Chastain-Skillman, Inc. Lakeland, Florida

August 31, 1994	"Analytical Methods in Industrial Hygiene: Principles of Air Sampling" University of South Florida College of Public Health Tampa, Florida
November 30, 1993	"Indoor Air Quality Sensitivity Training" Hillsborough County School Board Tampa, Florida
October 15, 1993	"Evaluating Indoor Air Quality Complaints" Florida Department of Education-Instructional Support Services Hillsborough County School Board Tampa, Florida
March 18-19, 1992 and December 7-8, 1992	"Introduction to Industrial Hygiene Air Sampling Techniques" Deep South Center for Occupational Health and Safety University of Alabama at Birmingham Birmingham, Alabama and Tampa, Florida

INVITED CONFERENCES AND WORKSHOPS

August 19, 2013	'Total Worker Health' 68th Annual Workers' Compensation Educational Conference Orlando, Florida
August 20, 2012	"Working With Nanoparticles: *Small Particles Posing Big Risks for Workers*" 67th Annual Workers' Compensation Educational Conference Orlando, Florida
December 15, 2011	"Investigating a Workers' Comp Mold Exposure Claim" Liberty Mutual Continuing Education Institute Tampa, Florida
August 23, 2011	"Hazard Communication" 66th Annual Workers' Compensation Educational Conference Orlando, Florida
September 24, 2010	"The Florida Mold Bill" American Industrial Hygiene Association Florida Local Section 2010 Fall Conference Saint Augustine, Florida
August 17, 2010	"Timely Topics in Environmental and Occupational Health" 65th Annual Workers' Compensation Educational Conference Orlando, Florida

June 10, 2010	"Nanotechnology: *Is this the Next Chinese Drywall or the Next Y-2K?*" Florida Liability Claims Conference Orlando Florida
May 13, 2010	"Hazard Communication ….. *past, present, and future*" American Society of Safety Engineers West Florida Chapter Professional Development Conference Tampa, Florida
November 16, 2009	"Chinese Drywall" – Professional Panel Participant (televised) Speak Up Presents Tampa Bay Community Network Tampa, Florida
August 17, 2009	"MRSA: *A Quick Primer on Methicillin Resistant Staphylococcus Aureus (MRSA) – The Bug, The Myth(s), Prevention and Response to an Exposure in Your "Environment"*!" Florida Sheriffs Workers' Compensation Self-Insurance Fund Annual Meeting Orlando, Florida
August 17, 2009	"MRSA: *A Quick Primer on Methicillin Resistant Staphylococcus Aureus (MRSA) – The Bug, The Myth(s), Prevention and Response to an Exposure in Your "Environment"*!" 64th Annual Workers' Compensation Educational Conference Orlando, Florida
August 17, 2009	"Colds and Sniffles: *Is It My Workplace?*" 64th Annual Workers' Compensation Educational Conference Orlando, Florida
September 9 and 10, 2008	"Understand What Mold is All About" "Minimize the Risk of Mold Claims" 'Proving Damages Caused by Mold Infestation' Seminar National Business Institute Tampa, Florida
August 19, 2008	"*MRSA*: How to Prevent and Respond to Exposures in Community, Occupational and Healthcare Settings 63rd Annual Workers' Compensation Educational Conference Orlando, Florida
March 19, 2008	"Responding to Mold Effects: *What Have We Learned?*" Local Chapter of International Association of Special Investigations Units Member Meeting Tampa, Florida

August 14, 2007	"The Post-Mold Era: *Timely Toxins of the Work Environment*" Florida Workers' Compensation Institute, Inc. 62nd Annual Workers' Compensation Educational Conference Orlando, Florida
August 14, 2007	"Indoor Environmental Testing: *Wise or Wasteful?*" Florida Workers' Compensation Institute, Inc. 62nd Annual Workers' Compensation Educational Conference Orlando, Florida
April 20, 2007	"The Role of the Industrial Hygienist in a Pandemic" American Industrial Hygiene Association Florida Local Section 2007 Spring Conference Palm Beach, Florida
March 30, 2007	"Mold Assessment and Control Methodologies: Lessons Learned" Kubicki Draper 2007 Claims Management Conference Kissimmee, Florida
September 27, 2006	"Managing Buildings to Avoid IEQ/Mold-Related Claims" Florida School Plant Management Association 46th Annual In-Service Training Seminar Daytona Beach, Florida
June 27, 2006	"Indoor Environmental Quality, Mold … Lessons Learned" Florida Sheriffs Workers' Compensation Self Insurance Fund Wesley Chapel, Florida
May 10, 2006	"The Mold Crisis … an Update on Current Thoughts and Practices" Haas, Dutton, Blackburn, Lewis, Longley & Lee, P.L. Property Damage Seminar Tampa, Florida
May 2, 2006	"Understand What Mold is All About" "Minimize the Risk of Mold Claims" 'Proving Damages Caused by Mold Infestation' Seminar National Business Institute Tampa, Florida
March 24, 2006	"Industrial Hygiene Practice: Reducing the Risk of Professional Liability" American Industrial Hygiene Association Florida Local Section 2006 Spring Conference Tampa, Florida
July 12, 2005	"The Mold Scare: Facts and Myths" Florida Gulfcoast Commercial Association of Realtors Tampa, Florida

June 10, 2010	"Nanotechnology: *Is this the Next Chinese Drywall or the Next Y-2K?*" Florida Liability Claims Conference Orlando Florida
May 13, 2010	"Hazard Communication ….. *past, present, and future*" American Society of Safety Engineers West Florida Chapter Professional Development Conference Tampa, Florida
November 16, 2009	"Chinese Drywall" – Professional Panel Participant (televised) Speak Up Presents Tampa Bay Community Network Tampa, Florida
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August 17, 2009	"MRSA: *A Quick Primer on Methicillin Resistant Staphylococcus Aureus (MRSA) – The Bug, The Myth(s), Prevention and Response to an Exposure in Your "Environment"*!" 64th Annual Workers' Compensation Educational Conference Orlando, Florida
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August 14, 2007	"The Post-Mold Era: *Timely Toxins of the Work Environment*" Florida Workers' Compensation Institute, Inc. 62nd Annual Workers' Compensation Educational Conference Orlando, Florida
August 14, 2007	"Indoor Environmental Testing: *Wise or Wasteful?*" Florida Workers' Compensation Institute, Inc. 62nd Annual Workers' Compensation Educational Conference Orlando, Florida
April 20, 2007	"The Role of the Industrial Hygienist in a Pandemic" American Industrial Hygiene Association Florida Local Section 2007 Spring Conference Palm Beach, Florida
March 30, 2007	"Mold Assessment and Control Methodologies: Lessons Learned" Kubicki Draper 2007 Claims Management Conference Kissimmee, Florida
September 27, 2006	"Managing Buildings to Avoid IEQ/Mold-Related Claims" Florida School Plant Management Association 46th Annual In-Service Training Seminar Daytona Beach, Florida
June 27, 2006	"Indoor Environmental Quality, Mold … Lessons Learned" Florida Sheriffs Workers' Compensation Self Insurance Fund Wesley Chapel, Florida
May 10, 2006	"The Mold Crisis … an Update on Current Thoughts and Practices" Haas, Dutton, Blackburn, Lewis, Longley & Lee, P.L. Property Damage Seminar Tampa, Florida
May 2, 2006	"Understand What Mold is All About" "Minimize the Risk of Mold Claims" 'Proving Damages Caused by Mold Infestation' Seminar National Business Institute Tampa, Florida
March 24, 2006	"Industrial Hygiene Practice: Reducing the Risk of Professional Liability" American Industrial Hygiene Association Florida Local Section 2006 Spring Conference Tampa, Florida
July 12, 2005	"The Mold Scare: Facts and Myths" Florida Gulfcoast Commercial Association of Realtors Tampa, Florida

May 12, 2005 — "The Mold Crisis: Its Effects on the Construction Industry"
Florida Construction Users Roundtable, Inc.
Lakeland, Florida

October 29, 2004 — "Regulatory Aspects of Indoor Environmental Quality"
Florida Occupational Health Conference
Saint Petersburg, Florida

October 24, 2003 — "Healthy Buildings .... Healthy People"
Keynote Presentation
Florida Occupational Health Conference
Florida State Association of Occupational Health Nurses, Inc.
Saint Petersburg, Florida

October 11, 2002 — "Mold Update"
American Industrial Hygiene Association
Florida Local Section
2002 Fall Conference
Orlando, Florida

October 3, 2002 — "Investing in IEQ...*current investments provide future benefits*"
Florida School Plant Management Association Meeting
Palm Harbor, Florida

April 12, 2002 — "Project Clearance for Mold Remediation"
American Industrial Hygiene Association
Florida Section
2002 Spring Conference
Orlando, Florida

July 18, 2001 — "What's New in IEQ?"
Florida Educational Risk Management Association
Longboat Key, Florida

July 1, 2001 — "Evaluating Health Complaints Associated with Exposures to Mold Contamination in the Indoor Environment"
National Environmental Health Association Annual Education Conference
Atlanta, Georgia

June 9, 2001 — "Evaluating a *Sick* Building"
Florida Allergy, Asthma & Immunology Society Annual Meeting
Saint Augustine, Florida

April 26, 2001 — "Building Mold"
Manatee County Safety Council and Florida Suncoast Chapter of the American Society of Safety Engineers
Bradenton, Florida

October 26, 2000 — "Recognition and Evaluation of Indoor Biological Contaminants"
American Industrial Hygiene Association
Florida Section
2000 Fall Conference
Orlando, Florida

September 27, 2000 — "Preventing Exposures to *Legionella*"
Florida School Plant Management Association, Inc.
Orlando, Florida

June 20, 2000 — "Indoor Environmental Quality Assessment Strategies"
University of South Florida Sunshine Education and Research Center
Tampa, Florida

January 27, 2000 — "Indoor Air Quality and Hypersensitivity-the Next Generation"
Florida Educational Facilities Planners' Association, Inc.
Winter Conference
Amelia Island, Florida

July 20, 1999 — "What to Do When *Stachybotrys* is Found in Your Building"
Florida Safety and Health Institute
Orlando, Florida

May 27, 1999 — "Conducting an Indoor Environmental Quality Investigation"
Florida Environmental Health Association
Orlando, Florida

April 21, 1999 — "Spring Cleaning – Alternative Cleaning Agents and IEQ"
Asthma and Allergy Network – Pinellas Section
American Lung Association of Gulfcoast Florida
St. Petersburg, Florida

November 10, 1998 — "Indoor Biological Agents Assessment Techniques"
American Society of Safety Engineers
Sarasota Chapter
Bradenton, Florida

October 22, 1998 — "Bioaerosols in Indoor Environments"
Air and Waste Management Association
Tampa Bay Chapter
Clearwater, Florida

October 19, 1998 — "Indoor Allergen Avoidance Techniques"
Second Wind Transplant Group
Tampa, Florida

October 9, 1998	"Current Issues in Sampling and Analysis of Indoor Biological Agents" American Industrial Hygiene Association Florida Section 1998 Fall Conference Clearwater, Florida
September 24, 1998	"Production of Ochratoxin A by *Aspergillus ochraceus* Growing on Nutrient Media" Third International Conference on Bioaerosols, Fungi, and Mycotoxins: Health Effects, Assessment, Prevention, and Control Saratoga Springs, New York
September 4, 1998	"Whistle While You Work: Cleaning Compounds, Maintenance Chemicals, and Pesticides" 1998 Annual Meeting The Society of American Archivists Orlando, Florida
July 28, 1998	"Demonstration of Microbial Sampling Techniques" 1998 Florida Safety and Health Conference Florida Safety and Health Institute Orlando, Florida
June 18, 1998	"Indoor Air Quality and Pollution" Occupational and Environmental Lung Disease Course American College of Chest Physicians Tampa, Florida
May 12, 1998	"Ochratoxin A Production by *Aspergillus ochraceus* Growing on Ceiling Tile and Carpet" 1998 American Industrial Hygiene Conference & Exposition Atlanta, Georgia
February 23-24, 1998	"Collection and Analysis of Ochratoxin A Produced by *Aspergillus ochraceus*" 1998 Applied Workshop American Conference of Governmental Industrial Hygienists and the National Institute of Occupational Safety and Health Chapel Hill, North Carolina
January 8, 1998	"A Proactive Approach to Managing Indoor Air Quality" Environmental Health Workshop Bay County Health Department Panama City, Florida
December 4, 1997	"Investigation and Resolution of Indoor Air Quality Problems" Annual Joint Conference Florida School Boards Association Tampa, Florida

October 21, 1997	"Biocontaminants of Indoor Environments" Florida Environmental Expo '97 Tampa, Florida
August 13, 1997	"Microbial Evaluations: Interpreting the Results" 1997 Florida Safety and Health Conference Florida Safety and Health Institute Orlando, Florida
May 19, 1997	"Collection of Airborne Mycotoxin on Membrane Filters and Analysis Using High-Pressure Liquid Chromatography With Ultraviolet Absorbance Detection" 1997 American Industrial Hygiene Conference & Exposition Dallas, Texas
October 3, 1996	"Investigation and Resolution of Indoor Air Quality Problems" Florida Environmental Expo '96 Tampa, Florida
May 7, 1996	"A Proactive Approach to Managing Indoor Air Quality" Environmental Essentials for the 90's Workshop Department of Environmental Resources Management Miami, Florida
October 30, 1995	"Designing Indoor Air Quality Ready Air Handling Systems" Tampa Bay Trane Tampa, Florida
September 20, 1995	"Bioaerosols in Indoor Environments" Florida Environmental Expo '95 Tampa, Florida
September 22, 1994	"Bioaerosols in the Indoor Environment" Indoor Air Quality Seminar National Safety Council - Tampa Chapter Tampa, Florida
December 1, 1993	"Evaluating Indoor Air Quality Complaints" Winter Conference Florida Educational Risk Managers Association Winter Haven, Florida

ATTENDED CONFERENCES AND WORKSHOPS

August 19, 2013	68th Annual Workers' Compensation Educational Conference Orlando, Florida
August 20, 2012	67th Annual Workers' Compensation Educational Conference Orlando, Florida

August 23, 2011	66th Annual Workers' Compensation Educational Conference Orlando, Florida
April 1, 2011	American Industrial Hygiene Association Florida Local Section 2011 Spring Conference Stuart, Florida
October 19, 2010	2010 Florida Occupational Safety Conference & Expo Lakeland, Florida
September 24, 2010	American Industrial Hygiene Association Florida Local Section 2010 Fall Conference Saint Augustine, Florida
August 15 - 18, 2010	65th Annual Workers' Compensation Educational Conference Orlando, Florida
June 10, 2010	Florida Liability Claims Conference Orlando, Florida
May 13, 2010	American Society of Safety Engineers West Florida Chapter Professional Development Conference Tampa, Florida
April 29-30, 2010	American Industrial Hygiene Association Florida Local Section 2010 Spring Conference Stuart, Florida
November 5-6, 2009	Technical Symposium on Corrosive Imported Drywall Tampa, Florida
August 17-19, 2009	64th Annual Workers' Compensation Educational Conference Orlando, Florida
September 25-26, 2008	American Industrial Hygiene Association Florida Local Section 2008 Fall Conference Saint Augustine, Florida
September 9 and 10, 2008	Understand What Mold is All About" "Minimize the Risk of Mold Claims" 'Proving Damages Caused by Mold Infestation' Seminar National Business Institute Tampa, Florida

August 18-19, 2008	63rd Annual Workers' Compensation Educational Conference Orlando, Florida
July 24, 2008	Indoor Air Quality Association – Tampa Chapter IAQA Workshop Tampa, Florida
September 27-28, 2007	American Industrial Hygiene Association Florida Local Section 2007 Fall Conference Saint Augustine, Florida
April 19-20, 2007	American Industrial Hygiene Association Florida Local Section 2007 Spring Conference Palm Beach, Florida
March 23-24, 2006	American Industrial Hygiene Association Florida Local Section 2006 Spring Conference Tampa, Florida
May 25, 2005	American Indoor Air Quality Council "Mold 101" Workshop Tampa, Florida
March 31-April 1, 2005	American Industrial Hygiene Association Florida Local Section 2005 Spring Conference Tampa, Florida
March 2, 2005	"Post 2004 Storms – A Moldy Mess in Schools, Homes & Commercial Facilities" American Indoor Air Quality Council Florida Atlantic University Port Saint Lucie, Florida
May 10-13, 2004	American Industrial Hygiene Conference and Exposition Atlanta, Georgia
April 2, 2004	American Industrial Hygiene Association Florida Local Section 2004 Spring Conference Palm Beach, Florida
November 3-5, 2003	"Mold Remediation: The Quest for Uniformity Symposium" American Conference of Governmental Industrial Hygienists Orlando, Florida
May 12-15, 2003	American Industrial Hygiene Conference and Exposition Dallas, Texas

May 11, 2003	"Indoor Air Quality Research: New Directions" 5th International Indoor Air Quality Symposium American Industrial Hygiene Conference and Exposition Dallas, Texas
May 10, 2003	"Environmental Mold: State of the Science, State of the Art" Symposium American Industrial Hygiene Conference and Exposition Dallas, Texas
June 3-6, 2002	American Industrial Hygiene Conference and Exposition San Diego, California
June 1-2, 2002	"Remediation and Prevention of Biological Contamination in Indoor Environments" American Industrial Hygiene Conference and Exposition San Diego, California
June 4 - 7, 2001	American Industrial Hygiene Conference and Exposition New Orleans, Louisiana
May 15, 2001	"HVAC Design Operation and Maintenance for Health: A Workshop for Educational Facilities Planners, HVAC Engineers and Maintenance Professionals" Florida Department of Education Saint Petersburg, Florida
May 20 - 25, 2000	American Industrial Hygiene Conference and Exposition Orlando, Florida
June 14 - 18, 1999	"Food and Airborne Fungi Workshop" Agriculture and Agri-Food Canada Centralbureau voor Schimmelcultures Ottowa, Canada
June 7 - 11, 1999	American Industrial Hygiene Conference and Exposition Toronto, Canada
February 8 - 9, 1999	"Bioaerosols: Assessment and Control" American Conference of Governmental Industrial Hygienists Orlando, Florida
November 5, 1998	"Floods, Sewage, Mold - The Remediators" Environmental Protection Agency Course University of Tulsa Center for Environmental Research and Technology Kissimmee, Florida

November 4, 1998	"Cleaning for a Healthy Indoor Environment" Environmental Protection Agency Course University of Tulsa Center for Environmental Research and Technology Kissimmee, Florida
September 23 - 25, 1998	Third International Conference on Bioaerosols, Fungi, and Mycotoxins Saratoga Springs, New York
July 26 - 29, 1998	10th Annual Florida Safety and Health Conference Orlando, Florida
July 8 - 9, 1998	Children at Risk: Environmental Health Issues in the Great Lakes Region United States Environmental Protection Agency and the Agency for Toxic Substances and Disease Registry Chicago, Illinois
May 9 - 15, 1998	American Industrial Hygiene Conference and Exposition Atlanta, Georgia
April 15 - 17, 1998	Indoor Environment '98 Conference Washington, D.C.
February 23 - 25, 1998	American Conference of Governmental Industrial Hygienists 1998 Applied Workshop: Occupational and Environmental Exposure Assessment Chapel Hill, North Carolina
October 21 - 23, 1997	Florida Environmental EXPO Tampa, Florida
May 17 - 23, 1997	American Industrial Hygiene Conference and Exposition Dallas, Texas
January 30, 1997	"Tuberculosis 2000: Fundamentals of Clinical Tuberculosis and Tuberculosis Control" National Laboratory Training Network Satellite Broadcast University of South Florida College of Public Health
October 22 - 23, 1996	"Microbial and Chemical Building Contaminants" Air Quality Sciences, Inc. Atlanta, Georgia
October 1 - 3, 1996	Florida Environmental EXPO Tampa, Florida
May 20 - 24, 1996	American Industrial Hygiene Conference and Exposition Washington, D.C.

March 17, 1996	Symposium on Water Leakage Through Building Facades American Society of Testing and Materials Orlando Florida
September 19 - 21, 1995	Florida Environmental EXPO Tampa, Florida
August 1, 1995	"Lightning Safety" Florida Association of Safety Councils' Program Tampa Area Safety Council, Inc. Tampa, Florida
May 15 - 16, 1993	"ACGIH Guidelines: Assessing Bioaerosols in the Workplace" American Industrial Hygiene Conference and Exposition New Orleans, Louisiana
February 22, 1993	"Microorganisms in Indoor Air: Health Complaints Associated with Environmental and Occupational Settings" Pathcon Laboratories Atlanta, Georgia
May 18-19, 1991	"Inhalation Toxicology: Bridging the Gap Between Research and Industrial Hygiene Applications" American Industrial Hygiene Conference and Exposition Salt Lake City, Utah

CONTINUING EDUCATION COURSES

December 9, 2011	"Accident Investigations" Tampa Area Safety Council and OSHA Alliance Workshop Tampa, Florida
September 16, 2011	"OSHA Workplace Violence Incident Investigations and Prevention Programs" Tampa Area Safety Council and OSHA Alliance Workshop Tampa, Florida
June 15, 2011	"USP-797 Compliance Requirements and Testing Services" Webinar EMLab P & K, LLC Tampa, Florida
April 5, 2011	"Mold: Health Effects, Sampling, and Data Interpretation" Webinar EMLab P & K, LLC Tampa, Florida
March 30, 2011	"Idea Into Action – Rolling Out a Small Consulting Practice" American Industrial Hygiene Association Florida Local Section Spring Conference Stuart, Florida

March 30, 2011	"Professional Ethics for the Industrial Hygienist" American Industrial Hygiene Association Florida Local Section Spring Conference Stuart, Florida
December 10, 2010	"Powered Industrial Vehicles" "Forklift Safety: Integrating Minimum Performance Standards Into the Real World" Tampa, Florida
November 23, 2010	"Allergens and Bacteria" Webinar EMLab P & K Tampa, Florida
September 23, 2010	"Investigative Photography for Safety & Health Professionals" American Industrial Hygiene Association Florida Local Section Fall Conference Saint Augustine, Florida
August 9 – 12, 2010	"OSHA Guide to Industrial Hygiene" OSHA Training Institute Course No. 521 Tampa, Florida
June 16, 2010	"Introduction to Bacteriology" Webinar EMLab P & K Tampa, Florida
April 30, 2010	"Advanced Methods for Heat Stress and Strain" American Industrial Hygiene Association Florida Local Section Spring Conference Stuart, Florida
April 30, 2010	"Keys to Success for the Incidental Trainer" American Industrial Hygiene Association Florida Local Section Spring Conference Stuart, Florida
September 25, 2008	"Implementing Reproductive and Developmental Health Programs" American Industrial Hygiene Association Florida Local Section Fall Conference Saint Augustine, Florida

September 25, 2008 "Environmental Regulations for the Industrial Hygienist"
American Industrial Hygiene Association
Florida Local Section
Fall Conference
Saint Augustine, Florida

June 2, 2008 "Disaster Behavioral Health First Aid Specialist Training for Responders"
University of South Florida College of Public Health
Tampa, Florida

September 27, 2007 "Leadership in Energy and Environmental Design (LEED)"
American Industrial Hygiene Association
Florida Local Section
Fall Conference
Saint Augustine, Florida

September 27, 2007 "Control Strategies to Comply with the Hexavalent Chromium Standard"
American Industrial Hygiene Association
Florida Local Section
Fall Conference
Saint Augustine, Florida

April 19, 2007 "Nanotechnology – Occupational Safety and Environmental Health Issues"
American Industrial Hygiene Association
Florida Local Section
Spring Conference
Palm Beach, Florida

April 19, 2007 "Microscopy and Thermography – Aspects Related to Aerosol Analysis and Real-Time Infrared Diagnostics"
American Industrial Hygiene Association
Florida Local Section
Spring Conference
Palm Beach, Florida

April 4, 2007 "Risk Communication: Helping Your Community Cope After a Disaster & Mental Health in the Aftermath of Disaster"
University of South Florida: Sunshine Education and Research Center
Tampa, Florida

February 7, 2007 "Avian and Pandemic Flu"
University of South Florida: Sunshine Education and Research Center
Tampa, Florida

August 3, 2006 "Biological Hazards in the Workplace: Defining Endotoxins"
Webinar
American Conference of Governmental Industrial Hygienists
Tampa, Florida

March 23, 2006 "Audit and Assessment Programs: Management Tools for EHS Professionals"
American Industrial Hygiene Association
Florida Local Section
2006 Spring Conference
Tampa, Florida

March 23, 2006 "The Utilization of Industrial Hygiene Instrumentation for Indoor Air Quality Assessments"
American Industrial Hygiene Association
Florida Local Section
2006 Spring Conference
Tampa, Florida

May 25, 2005 "Post-Remediation Clearance Training Course"
American Indoor Air Quality Council
"Mold 101" Workshop
Tampa, Florida

May 25, 2005 "Hands-On: Nuts & Bolts of Mold"
American Indoor Air Quality Council
"Mold 101" Workshop
Tampa, Florida

May 17, 2005 "Exposure Reconstruction for Retrospective Epidemiology: Limitations and Promises"
University of South Florida Sunshine Education and Research Center
Tampa, Florida

March 31, 2005 "Implementing New Electrical Safety Requirements"
American Industrial Hygiene Association
Florida Local Section
2005 Spring Conference
Tampa, Florida

March 31, 2005 "Short-Term Exposure Monitoring/Heat Stress"
American Industrial Hygiene Association
Florida Local Section
2005 Spring Conference
Tampa, Florida

TEACHING EXPERIENCE

July, 2011 – present Variety of Undergraduate/Graduate Courses as Assistant Professor
Department of Environmental and Occupational Health
University of South Florida College of Public Health

Spring, 2012 Introduction to Public Health (*on-line*)
Undergraduate Course – Three (3) Semester Hours
University of South Florida College of Public Health

Public Health Seminar: Environmental and Occupational Health
Undergraduate Course – Three (3) Semester Hours
University of South Florida College of Public Health

Exposure Assessment and Control (*on-line: developed and administered*)
Graduate Course – Three (3) Semester Hours
University of South Florida College of Public Health

Fall, 2011 — Introduction to Public Health
Undergraduate Course – Three (3) Semester Hours
University of South Florida College of Public Health

Public Health Seminar: Environmental and Occupational Health
Undergraduate Course – Three (3) Semester Hours
University of South Florida College of Public Health

Summer, 2011 — Introduction to Public Health (*on-line*)
Undergraduate Course – Three (3) Semester Hours
University of South Florida College of Public Health

Critical Issues in Public Health (*on-line*)
Undergraduate Course – Three (3) Semester Hours
University of South Florida College of Public Health

Public Health Seminar: Environmental and Occupational Health
Undergraduate Course – Three (3) Semester Hours
University of South Florida College of Public Health

Spring, 2011 — Introduction to Public Health (*on-line*)
Undergraduate Course – Three (3) Semester Hours
University of South Florida College of Public Health

Spring, 2010 — Biostatistics
Undergraduate Course – Three (3) Semester Hours
University of Tampa

Fall, 2000 — Environmental and Occupational Health – Core Course
Graduate Course – Three (3) Semester Hours
University of South Florida College of Public Health

Spring, 2000 — Industrial Hygiene – Physical Agents
Graduate Course – Two (2) Semester Hours
University of South Florida College of Public Health

Spring, 1999 — Indoor Air Quality
Graduate Course – Two (2) Semester Hours
University of South Florida College of Public Health

Environmental and Occupational Health – Core Course
Graduate Course – Three (3) Semester Hours
University of South Florida College of Public Health

Industrial Hygiene – Physical Agents
Graduate Course – Two (2) Semester Hours
University of South Florida College of Public Health

Summer, 1998 — Indoor Air Pollution
Graduate Course – Two (2) Semester Hours
University of South Florida College of Public Health

Spring, 1998 — Industrial Hygiene – Physical Agents
Graduate Course – Two (2) Semester Hours
University of South Florida College of Public Health

RESEARCH EXPERIENCE

1995 — Mycotoxin Production by Fungal Organisms Growing on Indoor Building Materials
University of South Florida
College of Public Health

1992 — Air Sampling Techniques in Talc Mining Operations
University of Alabama at Birmingham
School of Public Health

1991 — Ergonomic Analysis of Aluminum Reduction Plant Workers
University of South Florida
College of Public Health

1991 — Evaluation of the Ventilation Characteristics of Clothing Garments
University of South Florida
College of Public Health

1991 — Evaluation of Industrial Hygiene Air Sampling Cyclone Efficiencies
University of South Florida
College of Public Health

GRANTS

1995 — "Mycotoxin Production by *Aspergillus ochraceus* Growing on Ceiling Tile and Carpet"
Chastain-Skillman, Inc.
Lakeland, Florida

PEER REVIEWS

2008	"Protecting Personnel From Pandemic Influenza" "Fundamentals of Biosafety in Laboratories" "Biosafety Risk Assessment and Risk Management" Professional Development Courses – Continuing Education Program 2009 American Industrial Hygiene Conference & Exposition
2008	"Inhibiting the Reaerosolization of Bacillus Spores - Is Water Enough?" Journal of Occupational & Environmental Hygiene
2007	"Health Effects of Residents Exposed to *Stachybotrys* in Water-Damaged Houses in Finland" Journal of Occupational & Environmental Hygiene
2007	"Testing Antimicrobial Paint Efficacy on Gypsum Wallboard Contaminated with *Stachybotrys chartarum*" Journal of Occupational & Environmental Hygiene
2006	A Practical Guide to Mold and the Indoor Environment in South Florida (2006) Walt Black, MS, CEHP, CSP (2006) ISBN 10: 0-9788264-0-X ISBN 13: 978-0-9788264-0-6
2006	"Controlled Study of Mold Growth and Cleaning Procedure on Treated and Untreated Wet Gypsum Wallboard in an Indoor Environment" Journal of Occupational & Environmental Hygiene
2005	Field Guide for the Determination of Biological Contaminants in Environmental Samples (2005) American Industrial Hygiene Association ISBN: 1-931504-62-8

PUBLICATIONS/POSTERS

Bourgeois, M., Pollenz, R., Salazar, R., Oberne, A., & Perrin, K. (???????????). *Creating Research Experience and Activities for Public Health Undergraduates Through Teaching Enhancement.* Poster presented at ??????????????

Beharry, A., Munoz, N., Cene, S., Ariza, C., Johnson, M., Patel, P. & Salazar, R. (April 20, 2013). *Desired Qualifications for Landing an Environmental/Occupational Health Job in Florida.* Poster presented at the University of South Florida 11th-Annual Raymond N. Castle Student Research Conference, Tampa, Florida.

Salazar, R., Perrin, K., Bourgeois, M. & Oberne, A. (April 17, 2013). *CREATTE Projects: First-Time Experiences of Public Health Faculty.* Poster presented at the University of South Florida Undergraduate Research and Arts Colloquium, Tampa, Florida.

Beharry, A., Cene, S., Munoz, N. & Salazar, R. (April 17, 2013). *Desired Qualifications for Landing an Environmental/Occupational Health Job in Florida.* Poster presented at the University of South Florida Undergraduate Research and Arts Colloquium, Tampa, Florida.

Dinescu, N., Velesquez, W., DuComb, L. & Salazar, R. (April 17, 2013). *Hearing Loss Caused by Personal Listening Devices in the Workplace: Where Does it Really Occur?* Poster presented at the University of South Florida Undergraduate Research and Arts Colloquium, Tampa, Florida.

Perrin, K., Manson, A., Oberne, A., Orriola, D., Rusnak, L. & Salazar, R. (August 8, 2012). *Bachelor of Science in Public Health: Results one year later.* Florida Public Health Association, Orlando, Florida.

Rusnak, L., Perrin, K., Oberne, A., Salazar, R. & Orriola, D. (2012, June). *Creating undergraduate leaders in public health: active learning.* Poster presented at the U.S. Public Health Service Scientific and Training Symposium, College Park, MD.

Perrin, K.M., Zhang, N., Cross, E., Lee, S.J., Salazar, R., Oberne, A., Orriola, D., & Rusnak, L. (April 11-12, 2012). *Educated students or happy students: Can we send happy, educated students into the workforce?* Association for Prevention Teaching and Research: Getting It Together: Prevention in Health Professions Education. Washington DC.

Oberne, A., Orriola, D., Perrin, K., Salazar, R. & Rusnak, L. (2012, April). *Healthy People 2020: From the Classroom to the Workforce.* National Health Promotion Summit: *Prevention. Promotion. Progress.*, April 10-11, 2012 in Washington, DC.

Orriola, D., Lake, J., Oberne, A., Dilley, C., Rusnak, L., Perrin, K., & Salazar, R. (2011). Public Health, Live on Tour: Experiential Learning is a Bus Ride Away for Undergraduate Students. Accepted to International Conference of Education, Research, and Innovation, November 14-16, 2011 in Madrid, Spain.

Salazar, R. R. (2004). "Recent Report Gives Insight into Health Effects from Indoor Mold in Homes and Other Buildings" (Interview comments) Woodsource, Fall 2004

Salazar, R. R. (1997). "Biocontaminants of Indoor Environments" Proceedings of the 1997 Florida Environmental Expo.

Salazar, R. R. (1997). "Production of Ochratoxin A by *Aspergillus ochraceus* Growing on Ceiling Tile and Carpet" Doctoral Dissertation, University of South Florida, College of Public Health.

Salazar, R. R. (1996). "Investigation and Resolution of Indoor Air Quality Problems" Proceedings of the 1996 Florida Environmental Expo.

Salazar, R. R. (1996). "Bioaerosols in Indoor Environments: Things You Should Know About the Air in Which You Work" Safety Resources, Second Quarter.

Salazar, R. R. (1995). "Bioaerosols in Indoor Environments" Proceedings of the 1995 Florida Environmental Expo.