



IAQ RADIO+

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Wildfire Characterization and IAQ Current Events

Good day and welcome to IAQ Radio+ episode 757blog. This week we welcomed Derrick A. Denis of Clark Seif Clark, Inc. (CSC) to discuss wildfire characterization assessment and remediation, hazards related to lithium battery fires, concerns of the mental health of those who routinely encounter traumatic situations, and much more.

Derrick A. Denis is a Senior Vice President with Clark Seif Clark, Inc. (CSC) and co-owner of P.U. Productions. He is a practitioner, inventor, educator, author and volunteer, who has provided industrial hygiene, environmental health and safety, infection control, and indoor environmental quality (IEQ) services for over 32 years. He is also an expert witness for insurance and litigation disputes for both plaintiffs and defendants. Derrick is also an inventor of, and patent holder for, Sewer Gas Solutions® a pourable evaporation inhibitor for p-traps from P.U. Productions.

Nuggets mined from today's episode:

How did you enter the environmental field?

Following obtaining his BS in Environmental Science and seeking work in the environmental field, Derrick left Oklahoma (where oilfield work was dried up) for southern California. His first job was hanging from a cherry picker and wipe sampling the underside of bridges for lead from historic combusted leaded gasoline.

Derrick what is your primary goal when you start working each day?

Derrick readily admits to having a hero complex and a firm commitment to preventing others from dying early.

From your experience, which requires more training and experience: mold assessment or structural fire damage assessment, and why?

CSC approach is to first find out what is the question you are trying to answer and then building an assessment protocol and any needed sampling protocol to answer the specific question.

Which is harder is all about timing. When mold assessments were fledgling in the late 1990s and early 2000s, CSC was at the tip of the spear assisting clients with questions about mold in the built environment. Today mold assessments are pretty easy. But at that time there were few resources. The diagnostic tools and proven resources were rare (e.g. there were few moisture meters, there was no digital borescope, digital cameras were heavy, expensive, and low quality, there were no commercially available portable IR cameras, there were very few mold labs, there were no guidelines, no certifications or few, few training courses, etc.). CSC independently researched the subject, scouring resources such as the AIHA Bioaerosols book, NYC Guidelines, university research, medical research, and more. They established an assessment protocol that was cutting edge at the time, but that even to this day is aligned with well-established current guidelines from EPA, WHO, CDC, etc. This abundance of mold resources today makes mold assessment a much lighter lift.

A structure fire has many variables and requires knowledge of varied hazards (lead, asbestos, lithium batteries, pesticides, etc.), understanding construction, understanding physical & electrical hazards, etc. The short answer is... today structural fire damage assessments require more expertise.

What is CSC's history of wildland-urban interface fire residue testing? In 2002 a Public Adjuster asked CSC to inspect around 30 buildings following the Rodeo-Chediski wildfire that burned in east-central Arizona's Ponderosa Pine forests beginning on June 18, 2002, and not controlled until July 7. It was the worst forest fire in Arizona's recorded history. Several local communities were threatened and had to be evacuated.

At that time surface fire residue assessment tools included visually assessing for black discoloration via a white glove test (wipe surface and look at hand for blackness) or a chemical sponge test (wipe surface with a chem-sponge and look at the sponge for blackness). Again, at the tip of the spear, CSC's research indicated soot (microscopic high carbon particles) was identifiable using direct microscopy and made up around 3% of wildfire smoke. To answer the client's question, CSC opted to experiment with visual assessment, digital photography, and collection of settled debris for soot analysis by a laboratory using light microscopy. While obvious 3-dimensional fire debris was visible within all the properties, 50% of the properties demonstrated lab results that were non-detect for soot. CSC recommended all the buildings be cleaned. The client was brought up on insurance fraud charges. Derrick explained the gaps in available science in his trial testimony and opined that based

on the experiment soot analysis alone was insufficient and that additionally char and ash analysis also needed to be done. CSC methods and conclusions withstood the legal challenge, and their client was awarded a large financial settlement.

Currently, CSC considers all available wildfire residue assessment tools, but generally relies on the use of composite wipes and microvacuums for collection and the use of advance microscopy for sample analysis of char, soot, and ash.

When the recent Los Angeles wildfires broke out; Derrick drove to Altadena, CA in his RV to support CSC's two Los Angeles area offices. Derrick refers to the Los Angeles wildland-urban interface (WUI) fires as "urban fires", because ~16,280 buildings burned. CSC adjusted their sampling approach for these events to consider characteristics of urban fires.

Are the terms "impacted" and "damaged interchangeable"? According to Derrick, smoke damage is the altering of something. Impact is like spilling something on the kitchen floor and wiping it up. Derrick gave these other examples of impact: asbestos release, Condition 2 mold, standing water on a water-resistant floor. (Z-Man cited Martin King's explanation "that the presence of smoke residue constitutes a damaged condition" as the restoration industry position.).

Is microscopy needed to "confirm" fire impact when the visible and olfactory evidence is overwhelming? Fire damage assessors and restorers are injected into chaos. Fire damage assessors can and should observe and report what's visually identifiable, and do not always need to sample. It is important for assessors to "look for the why". What restoration response is warranted? Sampling is most useful where there is no visual impact.

Step-Out Sampling is historically used for sampling the soil contamination of sites and involves systematically moving further away from the source at a contaminated site. Step-In Sampling is systematic gradation sampling while moving from an outdoor source deeper and deeper into the occupied space.

Make your assessments to a reasonable degree of scientific certainty. Take photos, take video, collect surface samples and bulk samples and hold as an alternative to sampling or not sampling. Use chains of custody and stay within any hold time or expiration time for your samples.

Franco Seif tells a made-up tale of a soiled baby diaper falling onto the floor and the parents wanting sampling for fecal coliform. The analogy is applied to the often-illogical frenzy associated with the current indoor environmental quality industry. Wildfire infiltration occurs first at penetrations (attic eaves, windows, doors, etc.) Once the wildfire residues enter the building the outside air loses most of its energy and the suspended residue settles quickly. CSC may recommend cleaning 3'-5' from affected penetrations. On wildfires CSC generally samples the exterior, the penetration points (doors and windows), attic, interior contents and structure, HVAC, and clothing separately.

What are the differences between wildland fires, wildland-urban interface fires, urban fires, and structure fires? Every structure fire is unique. Use of a cookie cutter assessment approach is prone to missing things. In structure fires heat and pressure force smoke residue into interstitial spaces. This doesn't occur on wildfires. It is uncommon for wildfire residue to be found in exterior wall cavities.

Who is qualified to take samples? A monkey could be taught to collect samples. A monkey cannot answer the questions: Why take the sample? Why use a lab? What do the results mean? The assessor normally goes alone, so there is not an available senior on site directing assistants. Lone junior staff may miss something. We need to teach the foundation of this business to our teams. For example, you cannot just hand out respirators. Junior people may know how to put a respirator on, but do they know the care and limitations or even the dangers of wearing a respirator? Everyone on your team should know the nuances of respirator use and the four requirements: Written Respiratory Protection Program, Medical Eligibility from a PHCP, Annual Training, and Annual Fit Testing.

Detectable doesn't always mean dangerous. From birth everything around us is trying to kill us! We can detect some substances at parts per trillion. A can of soda contains detectable lead, but you are unlikely to get lead poisoning from drinking soda.

The best way to clear trauma cleanup is to observe the crew doing the work. Is the antimicrobial EPA registered, is the product being applied according to the label instructions, has the antimicrobial had sufficient dwell time, do the cleaning practices result in the lifting of soils? If so, is it more likely than not that the processes met objectives. If additional levels of confidence are needed, then sampling can be a consideration.

For determining if wildland-urban interface fire losses have resulted in surface impacts, CSC uses the criteria that if there is less than 1% char, soot, or ash? Why 1%, because 1% is the level of quantification (LOQ) from the laboratory. The LOQ is the lowest repeatable result a lab can confidently enumerate. Err on the side of safety of the occupants. Derrick considers this approach to be very conservative.

What is the result of the nonexistence of pre-fire event baselines on fire losses, etc.? These assessments are generally not health based. Based on the question asked, the goal is generally to determine the absence or presence of quantifiable deposits related to wildfires that were not present before the loss. A scary thought, CSC periodically gets called to sample suspicious powders found in rental cars, hotels, and businesses for fentanyl.

Source Control? It's hot in Arizona. The gasoline in gas cans stored in garages evaporates fast, so it's common for people to bring gas cans indoors. We don't issue organic vapor respirators to occupants. We recommend removing the gas can. Source control needs to be the emphasis whenever possible.

What do you mean by the term "Ash is Cash"? A money grab mentality similar to "Mold is Gold". Self-proclaimed overnight experts coming out of the woodwork to do post wildfire testing, remediation, public adjusting, and litigation. Unsupported science and fear tactics are getting neighborhood groups frightened into frothy frenzies. These home and business owners are already under duress from the impacts of these fires. The demand to conduct wildfire residue testing for "ethyl-methyl-death" is not helping to resolve the issues at hand.

Why are lithium battery fires of concern? Lithium-ion batteries (LIBs) are all over. There are warehouses full of them. Lithium-ion batteries power for tools, cars, buses, tractor trailers, mobility devices, backup power for cities, etc. Lithium batteries smolder underwater as they continue to create their own oxygen to burn and continue to release toxic chemicals while maintaining a risk of evolving back into an energetic fire. Thermal runaway of lithium batteries in series complicates these fires. First responders to electric car fires risk electrocution due to stored energy and must refer to Emergency Response Guides (ERGs) before extrication of victims. Lithium batteries burn violently, ejecting molten metals and salts and spewing a combination of hazardous chemicals including Hydrogen Fluoride, Hydrogen Cyanide, Carbon Monoxide, etc. Burning lithium batteries often explode, especially when in a vessel that allows pressure and flammable gas accumulation (drum, cargo container, trailer, building, etc.) sending fire balls, concussive forces and, shrapnel

over distances. A hazardous black mass (e.g. nickel, cobalt, manganese, lithium, etc.) is leftover and needing cleaning by hazmat crews.

No one has an inventory of lithium batteries. Electrical outlets charging multiple lithium powered devices are subject to overload and catching fire.

<https://www.azcentral.com/story/money/business/energy/2020/07/27/aps-battery-explosion-surprise-new-report-findings/5523361002/> McMiken Energy Storage Facility Fire.

What PPE do you recommend for remediation workers cleaning up lithium fires?

Lithium fire cleanups are 40-hour HAZWOPER events. SCBA's are used during the fire and PAPR's during cleanup. Capture and dispose of runoff water and spent cleaning solutions. Comingled hazards of lithium and lead acid batteries are a concern. Derrick's advice on lithium battery fires is to let them burn out.

Job hazard analysis for a LIB fire in Phoenix in summer:

- 40-hour HAZWOPER
- Heat Stress
- Arc flash suit.
- Arc flash gloves
- Rubber boots with steel toes
- 1 hour in, 30 minutes out
- Decon setup
- Decon attendants
- Rescue team
- Paramedic
- Ice bath

Derrick's advice on lithium battery fire risk management:

- Use asbestos management program as a potential starting template.
- Don't install chargers next to buildings.
- Don't park vehicles under buildings.
- Manage your inventory of lithium batteries.
- Periodic inspection.
- End of life disposal.

Mental health of restoration workers? Restoration workers are injected into chaos. They cannot unsee what they've seen, unhear what they've heard, or unsmell what they've smelled. Seeing hurricane damage close-up. Seeing a baby's crib in a meth lab. The imprint of a dead person on a floor. Each of these traumatic episodes is a feather. 2,000 pounds of feathers weigh a ton. Graham Dick once told Derrick that he had "seen things he was not okay with" and that the restoration industry should talk about mental health. After many years of no movement in mental health for the industry, Derrick teamed up with Dr. Trevor Wilkens aka "the angry Viking therapist" to make a keynote presentation at the recent IAQA convention.

<https://neurotraumaproject.com/>

Acknowledging that restoration industry mental health as an undiscussed topic;

RadioJoe and I are sufficiently impressed that we are inviting Derrick and Trevor to do an IAQradio podcast and also advocating that they be invited to the 2026 RIA convention to make a keynote presentation.

RoundUp

- Tired of early morning calls to investigate natural gas leaks at evacuated hospitals and finding the cause of the complaint was simply sewer gas coming out of dry traps; Derrick and his business partner at P.U. Productions, chemist Paul V. Anderson, MS, CIEC invented a pourable evaporation inhibitor called Sewer Gas Solutions. The solution is applied to treat unused drains which dry out overtime. The solution maintains the water barrier in the unused trap to separate the sewer from the living space. Learn more at: SewerGasSolutions.com
- The treatment will protect a wet p-trap for up to 1 year.
- From the moment you are born everything is trying to kill you (UV light, radon, mold, viruses, bacteria, naturally occurring asbestos, apex predators, and other people). You must be resilient, or you wouldn't be here today.
- You are going to die. So, get busy doing what you think you need to do.

Z-Man signing off

Trivia: What was the confidential codename assigned to preparations for the D-day Invasion?

Answer: Bigot, sorry no correct answer