



Risky Rocks and Damp Dangers

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Favorite Quote



“In times of change, learners inherit the earth, while the learned find themselves beautifully equipped to deal with a world that no longer exists.”

— Eric Hoffer American moral and social philosopher
(1902-1983)

Hands On 1

- pure asbestos snow
- asbestos sad iron
- chrysotile containing rocks
- local NOA



Risky Rocks - Naturally Occurring Asbestos

“naturally-occurring asbestos” means asbestos that has not been processed in an asbestos mill - CCR17 93105

0.25% or greater asbestos in a sample analyzed using CARB 435 is regulated for use in roads (aggregate) by California and now NDOT which requires testing from sources now.

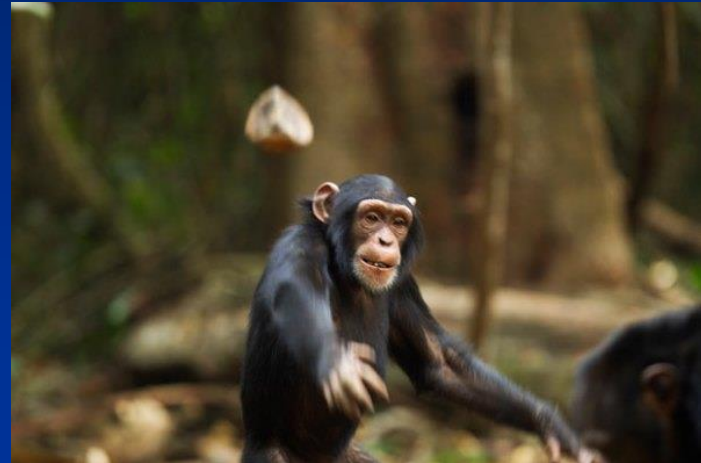
CARB 435 involves crushing the sample to a 200 mesh size (74 microns) and analyzing the sample by Polarized Light Microscopy and point counting 400 points.



I-11 Boulder City Bypass Phase NOA Exposure

Basically minimal to no personnel exposure
including crushing

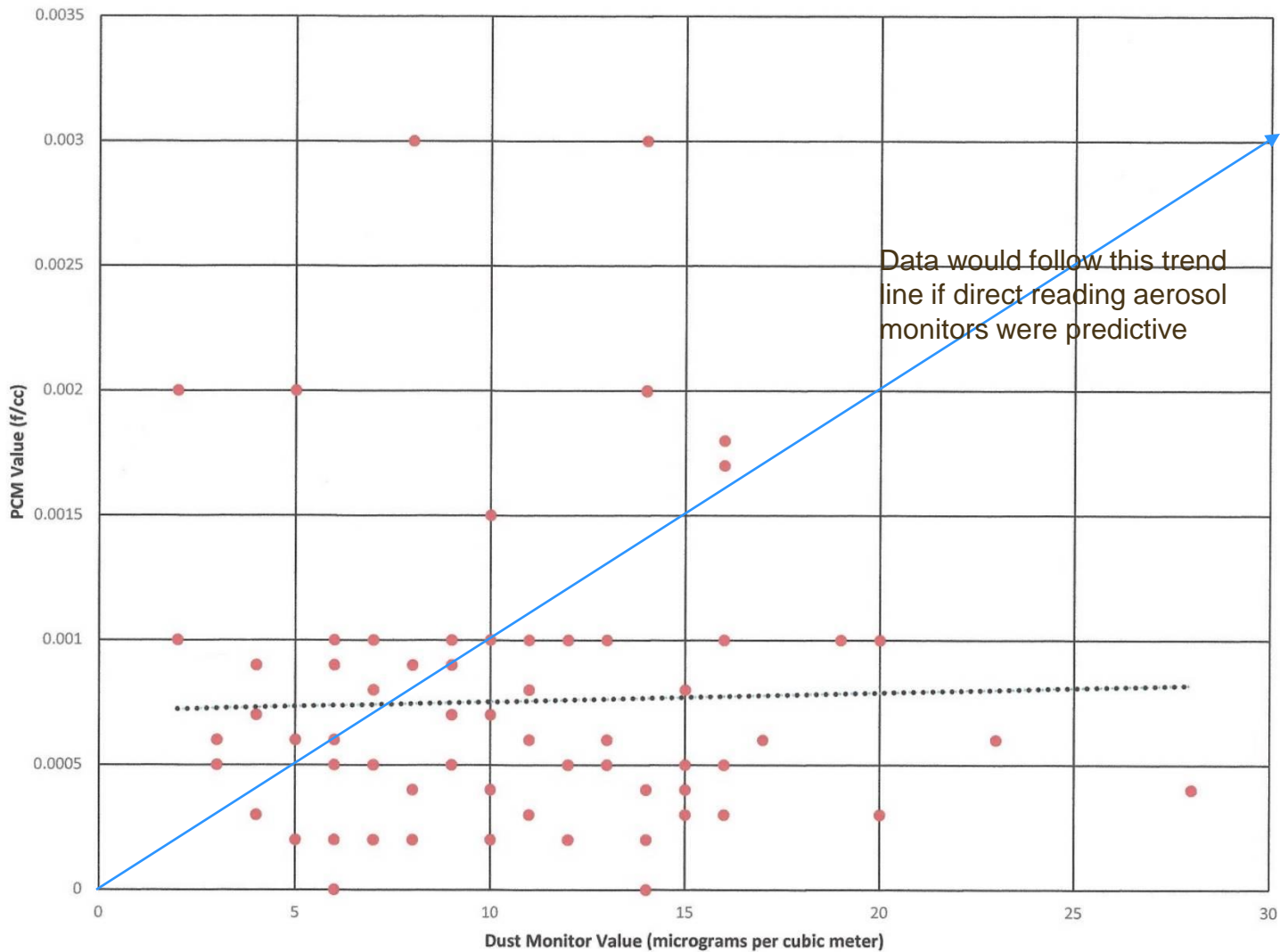
Can't inhale rocks
(<10 microns respirable)



The wetter the better. No dust is a must.

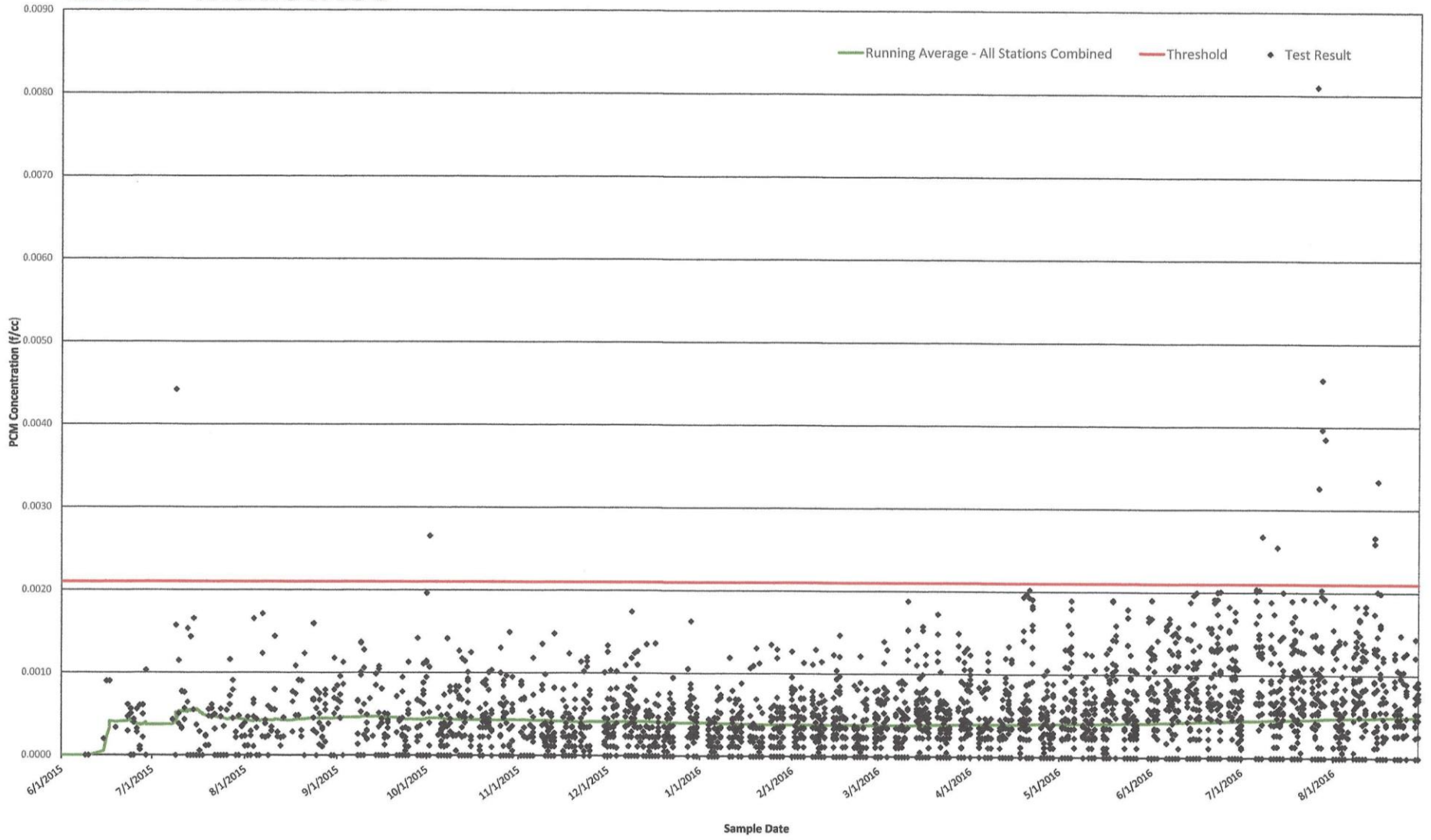
Finding – low ambient levels and direct reading
aerosol monitors not predictive (see graph)

Dust Monitor Results vs. PCM Values





Boulder City Bypass Phase I - Perimeter Air Running Averages



Another Risky Rock - Crystalline Silica (Quartz)

OSHA published standard March 25, 2016 – 29 CFR 1910.1053 and 1926.1053 Respirable Crystalline Silica standard.

Respirable fraction most important – deep lungs


Big impact on construction – demo, grinding/cutting concrete, grading, sanding drywall, drilling, etc.

Also impacts facility operations – cutting ceramic tiles, grouts, sanding drywall joint compound, paint prep, swimming pool filters

Reduce PEL from $100 \mu\text{g}/\text{M}^3$ to $50 \mu\text{g}/\text{M}^3$ and add an Action Level of $25 \mu\text{g}/\text{M}^3$



Both standards contained in the final rule take effect on June 23, 2016., after which industries have one to five years to comply with most requirements, based on the following schedule:

- Construction - June 23, 2017, one year after the effective date.
 - General Industry and Maritime - June 23, 2018, two years after the effective date.
 - Hydraulic Fracturing - June 23, 2018, two years after the effective date for all provisions except Engineering Controls, which have a compliance date of June 23, 2021.
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Requires employers to:

- use engineering controls (such as water or ventilation) to limit worker exposure to the PEL;
- follow manufacturers' instructions manual for controls (makes manual legal document);
- provide respirators when engineering controls cannot adequately limit exposure;
- limit worker access to high exposure areas;
- develop a written exposure control plan,
- offer medical exams to highly exposed workers,
- and train workers on silica risks and how to limit exposures.

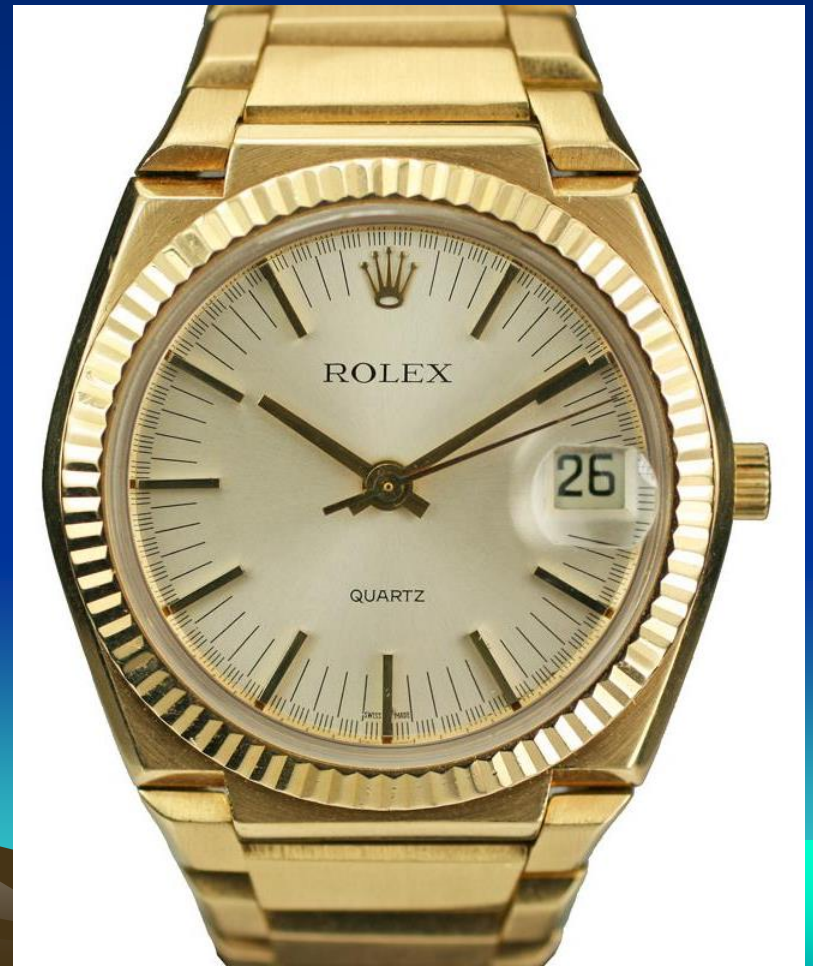


Also can require air monitoring if engineering controls not implemented or effective



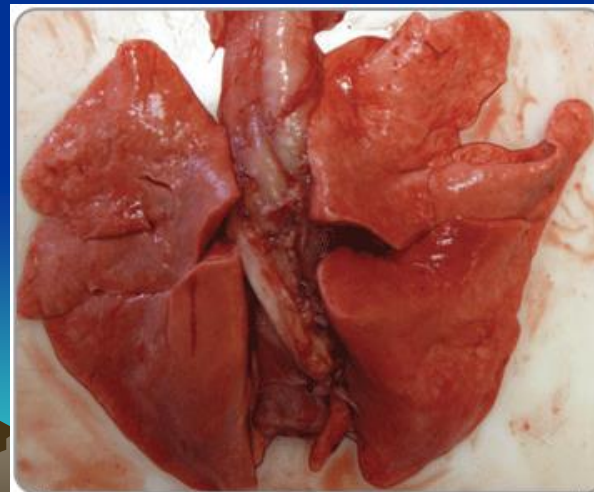
THE FAMILY Handyman

May also be referred to as Quartz



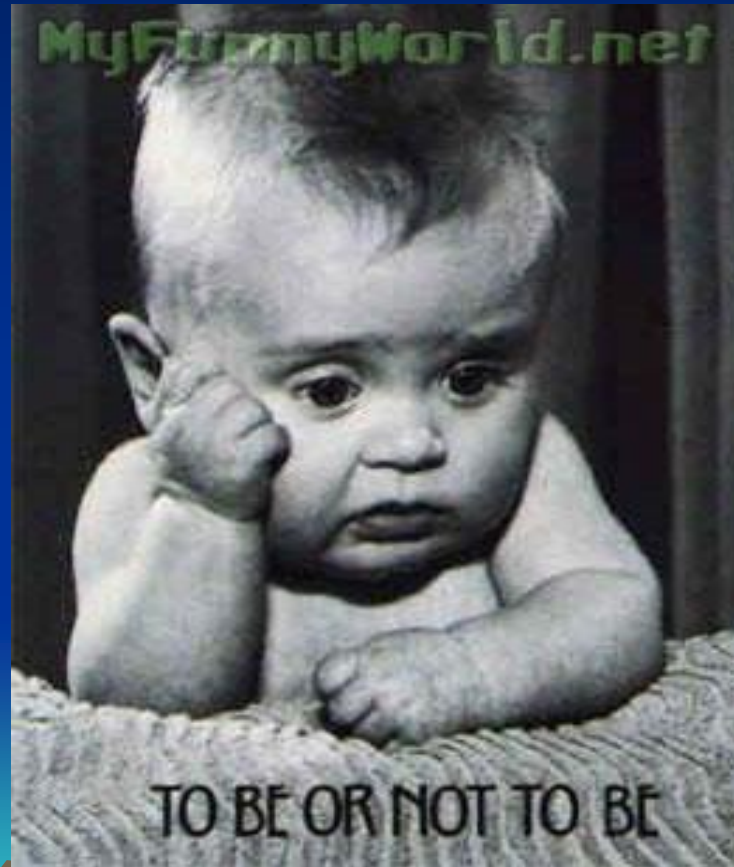
Health Effects of Silica Exposure

- Silicosis, a disabling, non-reversible and sometimes fatal lung disease;
- Other non-malignant respiratory diseases, such as chronic bronchitis;
- Lung cancer; and
- Kidney disease, including nephritis and end-stage renal disease.



Healthy lung

A QUIZ



What is NOA?

- a) A biblical character who built an Ark.
- b) National Office of Asbestos
- c) New Order of America
- d) Asbestos that has not been processed



What is Regulated NOA?

- a) A biblical character who built an Ark and almost didn't finish because the EPA didn't want him to take any endangered species like Unicorns and Dragons.
- b) The regulations applicable to the National Office of Asbestos
- c) Asbestos Containing Material with $>1\%$ asbestos
- d) A material containing asbestos that has not been processed and contains $\geq 0.25\%$ asbestos by the CARB 435 method



What activities in a facility may create exposure to respirable crystalline silica?

- a) Replacing swimming pool filter sand
- b) Cutting ceramic tiles with a saw
- c) Sanding drywall joint compound
- d) Mixing grouts
- e) All of the above



What will be required if the Silica Action Level is exceeded?

- a) A biblical character named Noa will keelhaul the violator under his Ark
- b) All silica at the worksite must be removed
- c) All employees must be placed in supplied air respirators
- d) Workers must be awareness trained, periodic air monitoring must be implemented, respirators must be offered, control methods must be used, etc.

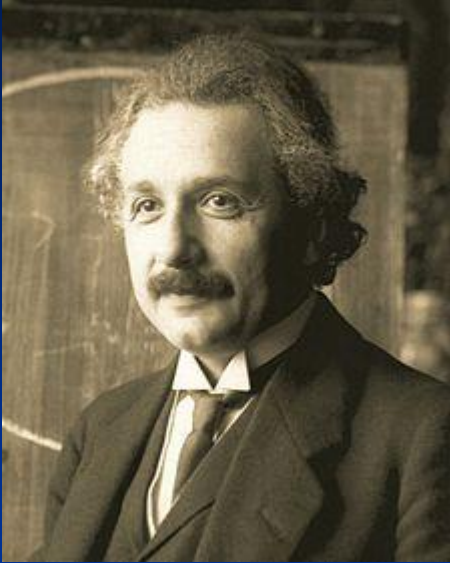


What is the main health effect of long term elevated exposure to respirable crystalline silica?

- a) Scratchy throat
- b) Crystals growing in your lungs causing pain
- c) Silicosis
- d) Asbestosis
- e) Sand coming out of your skin pores



Another Quote



"Only two things are infinite, the universe and human stupidity, and I'm not sure about the former."

- Albert Einstein (1879-1955)

Damp Dangers - Legionella Assessments

- ASHRAE 188 (2015) (risk management)
- ASTM D5952-08 (2015) (assessment/testing)
- Risk Assessment – stagnant water, aerosolization locations, exposure pathways, etc.
- New York case recently in the news – 81 cases / 7 dead / sickly elderly / mostly cooling towers



Legionella Basics

- Legionellosis - inhalation or aspiration of water droplets with Legionella bacteria – pneumonia (Legionnaires' disease) mild flu (Pontiac fever); no human to human
- Underlying illness or weakened immune system are most at risk; 10 to 50K cases per year; ~15% fatality rate.
- Low levels naturally in fresh water; amplification occurs where biofilms have been allowed to form; grows best in warm water >120°F = scalding - >130°F = kill Legionella
- Infected biofilm in domestic water piping can equal test and treat for life of building



Recent Case

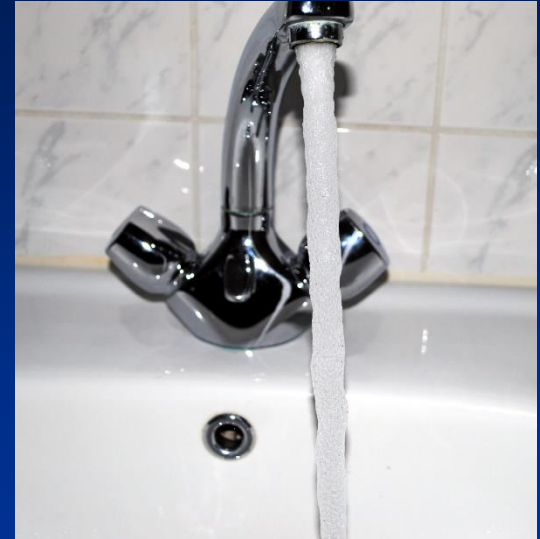
Man in mid 20s

Chain smoker

Rented condo that had been vacant

Hospitalized with Legionnaires disease for two weeks – almost died

Elevated Legionella in condo water, especially bathroom sink faucet where brushed teeth



Another Case

- Entertainment venue with no cooling towers, fountains, misters, etc.
- Legionella detected in domestic water system – mostly in water heaters
- Main issue was poor plumbing design and water heaters not kept at 140 degrees or above.
- CDC study has shown water temperature kept in Legionella “sweet spot” of 77° to 108°F is major contributor to outbreaks



More Damp Dangers - ASTM Visual Moisture Assessment Standard (New)

- ASTM E3026 (2015) - Standard Guide for Readily Observable Moisture Affected Materials and Conditions Conducive to Elevated Moisture in Commercial Buildings: **Visual Moisture Assessment (VMA)**
- Developed by E50.02 (Real Estate Assessment and Management subcommittee) to compliment Phase I ESAs and PCAs

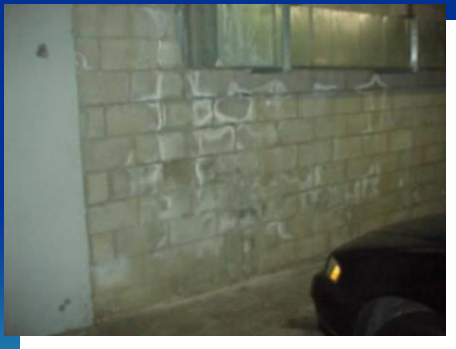


ASTM E3026-15

Visual Moisture Assessment Process

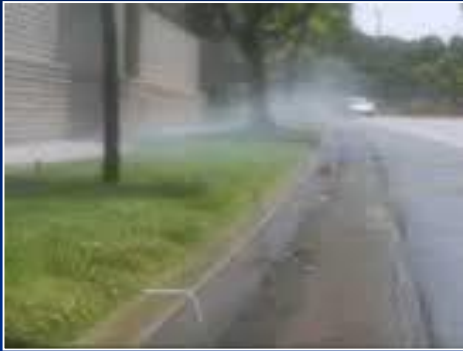
Elements of a VMA:

- Document reviews
- Interviews (Appendix X2)
- Walk-through survey (Appendix X3)
- Report



Photos by Jim Bartlett – E3026-15 Project Lead

ASTM E3026-15 Walk-Through Survey General, Site and Surroundings



Sprinkler overspray



Site slope/drainage



Standing Water



Downspout drainage



Detention Ponds



Water Features

ASTM E3026-15 Walk-Through Survey

Building Exterior



Façade Issues



Soil abutting building



Siding Issues



Ice jams



Evidence of leaks



Moisture-affected materials

ASTM E3026-15 Walk-Through Survey Roof



Lap/seam failure



Ponding/drainage



Penetrations



Flashing issues



Exhaust/venting issues



Extensive repairs

ASTM E3026-15 Walk-Through Survey HVAC, Plumbing and Mechanical



Mechanical system leaks



Plumbing leaks



Sump Pumps



Mechanical Condensation



Piping Condensation



Condensate drainage

ASTM E3026-15 Walk-Through Survey

Building Interior



Condensation



Visible moisture



Fungal growth



Stained ceiling tiles



Damp materials



Basement areas

ASTM E3026-15 VMA Elements

Excluded Activities

(4.5.3) Specifically excluded activities include:

(4.5.3.2) ***”Sampling of any type, including sampling for suspect fungi or other forms of biological growth, or sampling or otherwise measuring moisture or other physical characteristics.”***

ASTM E3026-15 VMA **Non-Scope** Elements

Common Diagnostic Enhancements



Borescope Probe



Moisture Meter



RH/Temp Meter



Infrared Camera



Microbial Air Sampler



Microbial Tape Sampling

Other ASTM Microbial Standards

Standards for sampling and analysis of fungal growth:

ASTM D7338-14 *Standard Guide for Assessment Of Fungal Growth in Buildings*

ASTM D7789-12 *Standard Practice for Collection of Fungal Material from Surfaces by Swab*

ASTM D7910-14 *Standard Practice for Collection of Fungal Material From Surfaces by Tape Lift*

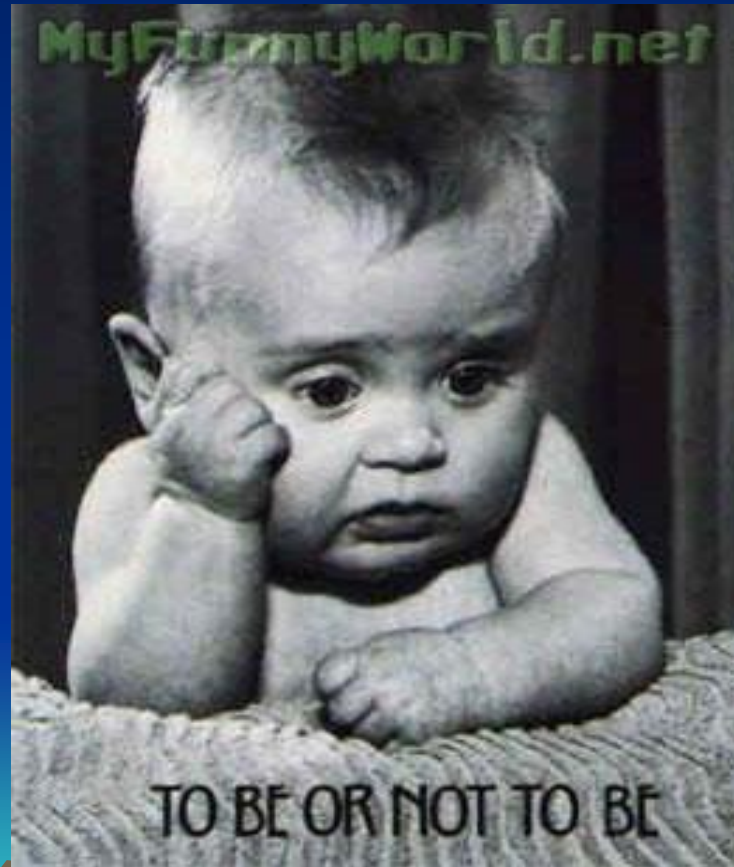
ASTM D7788-14 *Standard Practice for Collection of Total Airborne Fungal Structures via Inertial Impaction Methodology*

ASTM D7931-09 *Standard Test Method for Categorization and Quantification of Airborne Fungal Structures in an Inertial Impaction Sample by Optical Microscopy*

Working on Fungal Post Remediation Verification Standard, Analysis Methods for Tape Lifts, Swabs, and Agar Plates (also agar collection standard)



A QUIZ (part deux)



What is the main exposure pathway for Legionella bacteria?

- a) Touching a Legionnaire
- b) Sneezes from infected people
- c) Drinking water from Flint, Michigan
- d) Airborne small inhalable water droplets containing the bacteria



What aspect of facility maintenance is critical for preventing Legionella growth in the domestic water system?

- a) Making sure infected people are kept out of the building
- b) Assuring water temperatures do not fall into the 77-108°F “sweet spot” for Legionella growth and that hot water is stored at 140°F or higher and delivered at ~120°F, but not less
- c) Assuring that all water dispensing faucets have a strong chlorine odor
- d) Making sure piping “dead legs” are hyperchlorinated



Does the ASTM VMA standard include fungal sampling methods?

- a) Can you repeat the question?
- b) Definitely YES
- c) No opinion
- d) No



Last Quote



“Ignorance more frequently begets confidence than does knowledge: it is those who know little, not those who know much, who so positively assert that this or that problem will never be solved by science.”

— Charles Darwin, *The Descent of Man*

QUESTIONS

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**THANK YOU,
Thank You Very Much**

