

# Environmental Considerations in Long Term Care & Senior Living Communities

by  
**Derrick A. Denis**  
Senior Vice President  
Clark Seif Clark, Inc. (CSC)



Whether you know it or not,  
You are on the front line of providing good IEQ for our  
vulnerable populations



Your facility is  
first & foremost...  
**SHELTER**



---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

- No matter how amazing your clinical, administrative, environmental services, or public relations teams are...  
**if you ignore the facility, your people are in danger.**



HEALTHCARE FACILITY - ENVIRONMENTAL - ADMINISTRATIVE

### Overarching Messages

- EH&S & IEQ deficiencies result in **violations**
  - (F-Tags, Immediate Jeopardy (IJ), OSHA citations, NESHAP NOVs, etc.).
- No matter how amazing your clinical, administrative, environmental services, or outside vendor teams may be, **if you ignore the facility, people are in danger.**
- A good indoor environment
  - Improves health of residents & staff
    - Doesn't happen by accident
    - Is everyone's responsibility
    - Requires a holistic layered approach.
  - Is commonly underserved in the design and operation of LTC facilities



HEALTHCARE FACILITY - ENVIRONMENTAL - ADMINISTRATIVE

Lets discuss a few hot topics in no particular order

1. LEGIONELLA
2. VOCs
3. AIRBORNE INFECTION ISOLATION ROOMS
4. INADEQUATE OUTSIDE AIR (OA)
5. NUISANCE BIRDS
6. SEWER GAS
7. ASBESTOS
8. WATER INCURSION (FLOODS/LEAKS)
9. MOLD
10. RESPIRATOR FIT TESTING



HEALTHCARE FACILITY - ENVIRONMENTAL - ADMINISTRATIVE

# Legionella




---

---

---

---

---

---

---

## What is Legionellosis?

- An environmental disease.
  - Cannot be contracted from person to person
- Refers to 2 disease presentations:
  - **Pontiac Fever**
    - Flu-like symptoms
    - Self-resolving
    - Affects healthy adults
  - **Legionnaire's Disease (LD)**
    - Bacterial pneumonia
    - Can be fatal
    - Like most diseases it is more common and more significant for vulnerable populations
      - Immunocompromised, elderly, smokers, etc.




---

---

---

---

---

---

---

## Is Legionellosis (Legionnaires' disease and Pontiac fever) reportable?

- Yes, Legionellosis is a nationally notifiable disease.
  - Lab-confirmed cases of Legionellosis should be reported to state health departments, who are to notify CDC.
- CDC recommends public health officials perform a full investigation for the source of Legionella in a facility upon identification of:
  - **≥1 case** of presumptive healthcare-associated Legionnaires' disease at any time
  - **≥2 cases** of possible healthcare-associated Legionnaires' disease within 12 months of each other




---

---

---

---

---

---

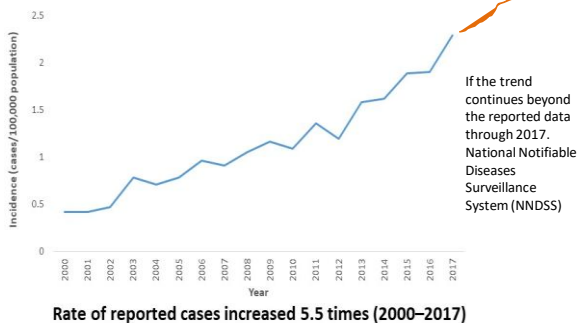
---

## The Numbers: Pontiac Fever

- Self Resolves
  - Because the flu-like symptoms self resolve, most healthy people do not seek medical attention.
- Underreported
  - Because it self resolves, there is virtually no diagnosis and therefore Pontiac Fever is severely underreported.



## Reports of Legionnaire's disease on the Rise in the USA



Source: National Notifiable Diseases Surveillance System

Centers for Disease Control and Prevention (CDC)

## Legionnaires' Disease

- US Health departments reported ~ 10,000 cases of Legionnaires' disease in the US in 2018 (CDC)
- But, Legionnaires' disease is likely underdiagnosed & therefore underestimated.
- A true number of Legionnaires' disease cases may be 1.8–2.7 times higher (CDC).
- "Atypical pneumonia" is often misdiagnosed (underdiagnosed) Legionnaires' Disease



# What Causes Legionellosis?

## Legionnaire's Disease & Pontiac Fever

- Both caused by inhalation of water droplets (mist) containing a viable common waterborne bacteria
- *Legionella pneumophila* (90% of time)
  - Typically *L. pneumophila* serogroup 1, but sometimes serogroups 2-14
  - Non-pneumophila species can cause the disease
    - *L. longbeachae*, *L. feeleii*, *L. micdadei*, and *L. anisa*.
- Collectively these bacteria are commonly referred to as **Legionella Disease Bacteria (LDB)**



Obligatory  
CDC Stock  
Photos of  
LDB



## Where do exposures to water droplets containing LDB originate?

- Common sources:
  - Water Heater
  - Cooling Towers
  - Heated Spa (Hot Tub)
  - Evaporative Coolers (Swamp)
  - Mister Systems (common for outdoor patio cooling)
  - Showers
  - Humidifiers
  - Aerators
  - Nebulizers
  - Decorative water fountains
  - Commercial pass-through dish washing machines
- The highest exposure potential to water mist for your vulnerable SNF population is during **showers**.



## A Disease of the Built Environment

- Naturally occurring LDB in freshwater is generally at insufficient quantities to cause disease
- The water reaching your facility or your home IS NOT STERILE, municipalities merely control microbes at delivery
- Pool example:



Photo credit to fatherly.com



WATER & ENVIRONMENTAL ENGINEERING

---

---

---

---

---

---

---

---

## DOMESTIC SUPPLY WATER IS NOT STERILE

- Disinfectants are added **to control** microorganisms, but domestic water supply is not sterile.
- After it leaves the treatment plant,
  - the disinfectant only lessen in concentration
  - the water contacts many nonsterile surfaces



WATER & ENVIRONMENTAL ENGINEERING

---

---

---

---

---

---

---

---

## From Disinfection to Coffee Pot

- City water treatment plant adds disinfectant (usually Chlorine)
- City Water
  - is pumped through miles of pipes to a water tower/tank
  - eventually the water leaves the tank & is pumped through a series of pipes until it arrives at your property line.
- Your buildings are jam-packed with complex plumbing systems where you store it, heat it, cool it, use it, etc.
- **After city disinfection, how many miles traveled and how much time passed before city water reaches your coffee pot?**



WATER & ENVIRONMENTAL ENGINEERING

---

---

---

---

---

---

---

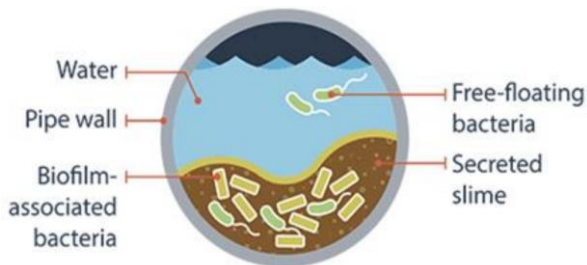
---

Some of the remaining live (viable) microorganisms are harmless, some are smelly, some cause poor taste, but some can pose a health risk to occupants.

- So, managing domestic supply water is a reasonable activity that deserves your attention and resources.



Cross-section of pipe containing biofilm and Legionella



• Image from: <https://www.cdc.gov/legionella/wmp/overview/growth-and-spread.html>



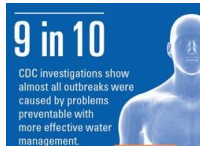
## The BAD News

- Is a serious matter:
- Legionnaires' disease kills
- In the general population 1 in 10 people who contract Legionnaires' Disease will die
  - (10% mortality rate)
- In healthcare settings that ratio is 4 in 10
  - (40% mortality rate)



## The GOOD News...

- Legionellosis is generally preventable through effective water management
- Your efforts make a difference in the safety of your staff and residents.
- How much of a difference?... (9 in 10)




---

---

---

---

---

---

---

---

## Higher Risk

- Examples
  - Healthcare settings
    - **Healthcare Associated Legionnaires Disease (HICALD)**
    - Hospitals
    - Senior living
    - Skilled Nursing
  - Institutions
    - Prisons,
    - Mental health facilities,
    - Boarding schools




---

---

---

---

---

---

---

---

## Higher Risk

- Factors working against these facilities:
  - Complex water systems
  - 24 hour occupancy
    - No break in exposure, &
    - No ability to shut down for maintenance
  - Immunocompromised occupants
    - More susceptible occupants
  - Limited water turn over facility wide.
  - Increased de facto dead legs from low use/no use of fixtures (vacant units, wings, etc.).
  - Lack of compliance as a priority




---

---

---

---

---

---

---

---



Where are the exposures to LDB laden water droplets originating?

- Common sources:
  - Water Heater
  - Cooling Towers
  - Heated Spa
  - Evaporative Coolers (Swamp)
  - Mister Systems (common for outdoor patio cooling)
  - Humidifiers
  - Aerators
  - Nebulizers
  - Decorative water fountains
  - Commercial pass through dish washing machines
- The highest exposure potential to water mist for your vulnerable SNF population is during showers.



---

---

---

---

---

---

---

---

# Legionella

- Rapid fire photo montage



---

---

---

---

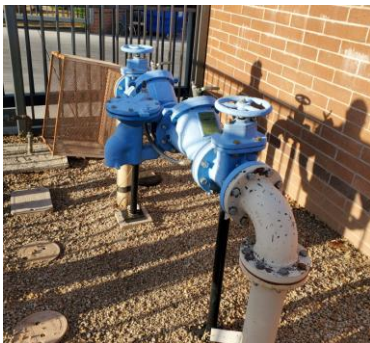
---

---

---

---

The creature from the municipal water supply



---

---

---

---

---

---

---

---

## Dead Legs



---

---

---

---

---

---

---

---

De facto Dead Leg.  
Simply and unused or  
underused plumbing  
run or fixture.  
Example:  
15 Year old fixture.  
Never even used once.



---

---

---

---

---

---

---

---

## The Often Overlooked... Spigot on the Roof



---

---

---

---

---

---

---

---

De facto dead legs from  
COVID-19 pandemic vacancy buildings or social  
distancing underuse of fixtures



---

---

---

---

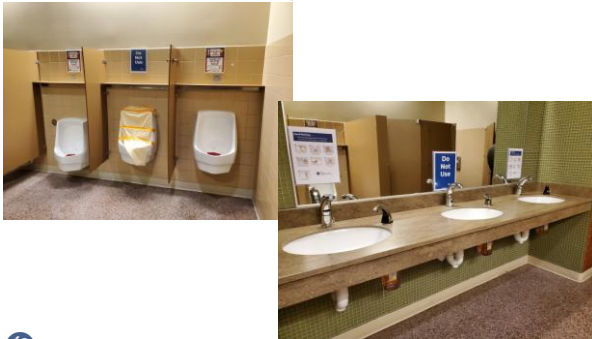
---

---

---

---

COVID-19 De facto dead legs  
1, 2, skip a few...



---

---

---

---

---

---

---

---

Storage of ~~Hot~~ Warm Water in Tanks of in  
Hot Water Loops



---

---

---

---

---

---

---

---

### Tan Water



---

---

---

---

---

---

---

---

Does the water in your water heater look like this?  
How would you know?



---

---

---

---

---

---

---

---

### Ice Maker With In-line Filter

Do you change yours? Did you just learn they have filters?



---

---

---

---

---

---

---

---

## Nebulizer

Where do you get your water?  
Not from the tap I hope.



WATER & SAFETY - ENVIRONMENTAL - ENVIRONMENTAL

---

---

---

---

---

---

---

---

## Cooling towers must be maintained

(Redundant towers makes taking one off line easier in summer months)



WATER & SAFETY - ENVIRONMENTAL - ENVIRONMENTAL

---

---

---

---

---

---

---

---

## On site water storage



WATER & SAFETY - ENVIRONMENTAL - ENVIRONMENTAL

---

---

---

---

---

---

---

---

## Fountains (Indoor or Outdoor)



You are **REQUIRED** to have a  
Water Management Plan (WMP)  
to Control Legionella Disease Bacteria

- Experience indicates
  - 9 out of 10 have a functioning WMP.
  - 5 of 10 have a document labeled WMP, but it is actually just the instruction book for writing and implementing a WMP.



Is Legionellosis (Legionnaires' Disease & Pontiac fever) Reportable?

- Yes, Legionellosis is a nationally notifiable disease.
- Lab-confirmed cases of Legionellosis should be reported to state health departments, who are to notify CDC.



## Federal Compliance

### 42 CFR §483.80 Infection Control for Skilled Nursing Facilities & Nursing Facilities:

- “The facility must establish and maintain an infection prevention and control program designed to provide a safe, sanitary, and comfortable environment and to help prevent the development and transmission of communicable diseases and infections.”



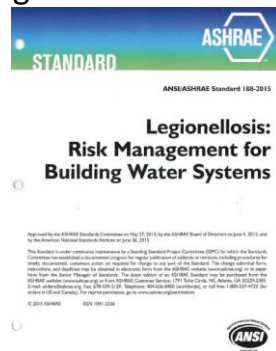
## CMS Compliance

- Facilities receiving Medicare & Medicaid funding are required to incorporate Legionella controls in a WMP
  - Per the CMS memo QSO-17-30-Hospitals/CAHs/NHs, released on June 2, 2017 (Updated July 6, 2018), titled, **“Requirement to Reduce Legionella Risk in Healthcare Facility Water Systems to Prevent Cases & Outbreaks of Legionnaires’ Disease (LD)”**,
  - “Facilities must develop and adhere to policies and procedures that inhibit microbial growth in building water systems that reduce the risk of growth and spread of Legionella and other opportunistic pathogens in water.”
  - This memo references **the ASHRAE Standard 188-2015: Legionellosis: Risk Management for Building Water Systems June 26, 2015** (currently on version 2021)



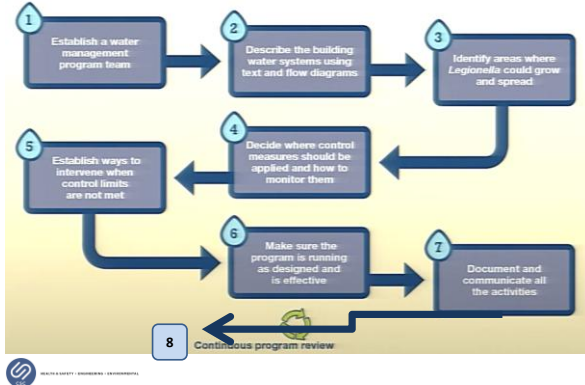
## The Program

- The purpose of this standard is to establish minimum Legionellosis risk management requirements for building water systems.





## 8 Elements of a WMP



While you are getting your WMP in Order...

## Don't Just Test for LDB

1. Presume & Continuously Manage
  - Measure temperatures, chlorine
  - Verify PM and regular flushing
  - Test if you want to see how management is functioning or for baseline, but be aware of consequences
2. If you test following an outbreak be prepared to:
  - Resample LDB at representative water locations regularly until under control.
  - Frequency and duration will vary based on jurisdiction and if local health departments are involved:
    - 3-5 days after any hyperchlorination.
    - After 2 weeks of flushing regime
    - Regularly until under control in some graduating frequency
      - bi-weekly, to monthly, to quarterly, to semi-annually, to annually.
    - Once under control, defer to the schedule in your Water Management Plan (WMP)



Regularly Measure **Chlorine & Temperatures**  
(and record them)

At water main, at water heaters, at repeated and at random proximal and distal points.  
[Ultralow chlorine test strips]



---

---

---

---

---

---

---

---

Point of Use (POU) Filters

(Remove LDB & allow time to address the plumbing system issues)  
Get a vendor now. Buy a cache now. Go in with your regional peers.



---

---

---

---

---

---

---

---

VOCs



---

---

---

---

---

---

---

---

# Chemical Storage



---

---

---

---

---

---

---

“A chemical odor...”



---

---

---

---

---

---

---



1.5 ppm & 56.4 ppm



---

---

---

---

---

---

---

Foo-foo oderants? No. No. No.



Source: <https://www.fox.com>

---

---

---

---

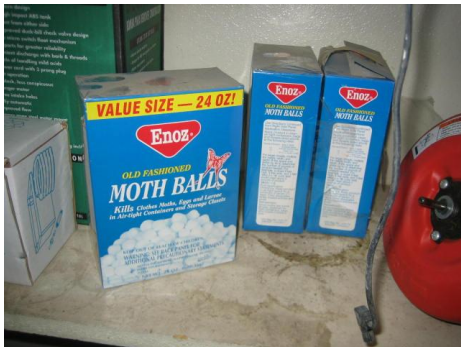
---

---

---

---

Naphthalene



Source: <https://www.fox.com>

---

---

---

---

---

---

---

---

Airborne  
Infection  
Prevention



Source: <https://www.fox.com>

---

---

---

---

---

---

---

---

## Isolating biohazard accumulation room

- Positive pressure in greater building
- Negative pressure in biohazard rooms, bathrooms, kitchens & janitors closets
- Consequences of Inadvertent depressurization of areas
- Tight buildings pros and cons



---

---

---

---

---

---

---



Simply adding an air barrier  
does not an Airborne  
Infection Isolation Room  
(AIIR) make.

Photo courtesy of RE-U-ZIP (Magnetic Closure)

---

---

---

---

---

---

---

## Building Pressures are not understood



---

---

---

---

---

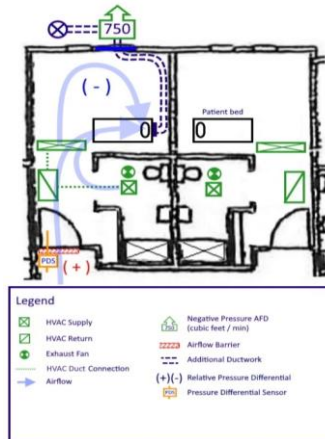
---

---

## Air Gaps



## Example of Airborne Infection Isolation Room (AIIR)



## Example of AIIR (W = Wing)



Let's get personal for a moment



---

---

---

---

---

---

---

---

### My recent hospital stay in an AIIR

- Often these rooms are designed to function
- But these rooms require consideration beyond mere functionality:
  - **AFD woes**
    - Noisy HEPA-filtered AFDs running next to your head 24/7 prohibit rest
    - AFDs cause air movement (6 or 12 ACH) which dries the skin, dry's your eyes and makes you cold
  - **Temperature Control**
    - The building was not designed for so much cold or hot outside air
    - Temporary climate control measures must be considered
  - **Isolation**
    - Being alone during medical care can trigger anxiety, loneliness and even despair that I have to believe from anecdotal experience can result in a degraded to come
    - Family cannot visit
    - Normal support mechanisms are severed
  - **Stigma**
    - Staff appears to avoid the normal healthcare worker compassion and kindness
    - Less check ins by custodians and nurses
  - **Faceless Minions**
    - Staff in PPE look like Darth Vader and seem impersonal and faceless
  - **Stagnation**
    - No exercise due to sequestration promoting atrophy and bedsores
- Whose job is mental and spiritual health? Who checks on emotional wellness? Does your AIIR design consider the resident experience?



---

---

---

---

---

---

---

---

INADEQUATE  
OUTSIDE AIR



---

---

---

---

---

---

---

---

## HVAC In IAQ & Infection Control

- HVAC is a tool in the toolbox that is being heavily overlooked in prevention of, and in response to, poor IAQ.




---

---

---

---

---

---

---

## HVAC In IAQ & Infection Control

- Example: HVAC can help control airborne infections in multiple ways:
  - "Solution-to-pollution-by-dilution"
    - OA
    - Mixing
    - Longer run time
  - Filtration
    - Upgrade MERV rating
    - Frequently change filters
  - Desiccating (drying) pathogens to reduce viability ½ life
  - Controlling flow of air
    - Local exhaust
    - AIIR




---

---

---

---

---

---

---

## No OA = Poor IEQ & Increased Infection Rates




---

---

---

---

---

---

---

### Not Getting Enough Outside Air?



---

---

---

---

---

---

---

---

### Saving Money on Fan Belts



---

---

---

---

---

---

---

---

### Saving Money on Fan Belts



---

---

---

---

---

---

---

---



## HVAC for Infection Control (recognize the penalties)

- Energy penalty
- Comfort penalty
  - Site equipment may not be able to keep up with demands temperature and humidity demands in extreme weather (monsoon, summer, winter, etc.)




---

---

---

---

---

---

---

## Positive Pressure & Solution by Dilution

- Q: How do you prevent infiltration of undesirable gasses and particulates into your building from undesirable locations?
  - A1: Bring in OA at controlled filtered conditioned locations
  - A2: Pressurize the building and leak outwards
- How do you control non-point source pollutants such as body odor, paper dust, communicable airborne infections, humidity?
  - A1: Exhaust “used” air and bring in “fresh” air




---

---

---

---

---

---

---

## Filters 101

- HVAC filters do not directly improve indoor air quality, they protect the coils
- They catch grasshoppers and tumbleweeds before they reach the cooling coils or heating elements
- Junk that bypasses the filter indirectly degrades IAQ




---

---

---

---

---

---

---

# Nuisance Birds



## Nuisance Birds

- Over 60 diseases are attributed to birds
- Routes of exposure:
  - Food and water contaminated with feces.
  - Inhalation of contaminated dust.
  - Transference by parasites
  - Direct contact with feces.
- Over Hazards
  - Roof Collapse
  - Reduced Ventilation System Lifespan
  - Fire Hazard
  - Corrosion



## Nuisance Birds






---

---

---

---

---

---

---

---

Get on your roof regularly




---

---

---

---

---

---

---

---

## Aviaries

- The same infection issues produced by nuisance birds can occur in your aviaries.
- Consider removing them.
- If keeping them
  - Consider isolating them
  - Consider ventilating them




---

---

---

---

---

---

---

---

SEWER GAS

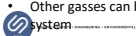


## Group Participation... What is Sewer Gas?



### Sewer gas is not one thing

- Sewer gas is a combination of things
- Gasses in the sewer commonly include:
  - Hydrogen sulfide,
  - Sulfur-dioxide,
  - Methane,
  - Methyl mercaptan,
  - Ammonia,
  - Carbon dioxide,
  - Water vapor
- Concentrations of each constituent can vary wildly
  - Time of day
  - What's upstream (residential, commercial, restaurant)
  - Ambient temperatures
  - Nearby line jetting
  - Building pressures (positive, negative)
- Other gasses can be present, depending on what is being drained to the sanitary sewer



## Sewer Gas

- Smells bad
- Hurts people (Irritates mucosa)
- Corrodes metal
- Smells like the additive to natural gas
- Means there's unrestricted access for sewer critters,
- It is flammable
- and more.



---

---

---

---

---

---

---

## Causes of Sewer Gas Infiltration



---

---

---

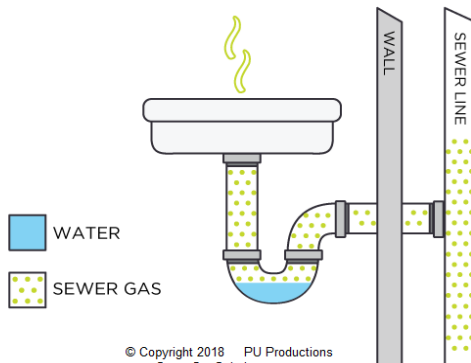
---

---

---

---

## Simply a Dry P-Trap Most of the Time



---

---

---

---

---

---

---

## Dry Toilets Are Often Obvious



---

---

---

---

---

---

---

---

## Dry Floor Drains

- Note: Just because you might reflected water, does not mean there is not an air gap.



---

---

---

---

---

---

---

---



## Under-Used Showers



---

---

---

---

---

---

---

---

### Under-Used Mop Sinks



---

---

---

---

---

---

---

### Failing Fire Panel 3 times at \$6k a pop



---

---

---

---

---

---

---

### Unused Washing Machine Drain Oxidized Brass and Chrome



---

---

---

---

---

---

---

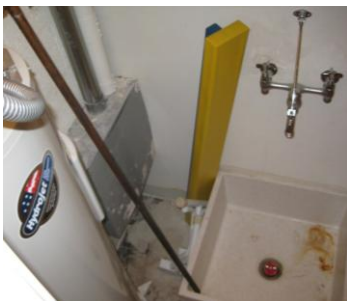
Unused Sinks  
Brass Oxidation



Stopping Sewer  
Gas Infiltration from  
Dry Traps



Do Not Cap The Drains!  
Unless you want to flood your buildings





## How Then Do You Prevent Sewer Gas Infiltration from Dry Traps?

- Option 1. – ADD WATER CONTINUOUSLY
  - Send someone weekly to manually add water to all traps manually (run shower, run dishwasher, run washing machine, use mop sink, etc.
    - Pro – Water is cheap & easy
    - Con – Labor intensive & costly
    - Con - Often miss locations
- Option 2. – ADD EVAPORATION INHIBITOR
  - Add Evaporation Inhibitor Every 6 months to 1 Year
    - Pro – Long lasting, Green, Safe, Pleasant Odor, No need to do anything to begin using fixtures
    - Pro – Nothing to do to begin using plumbing as normal
    - Con – Must buy product
    - Con – Will flush out after several uses of the fixture, so remember to reapply for seasonal vacancy scenarios (snowbirds, school summer break, etc.)




---

---

---

---

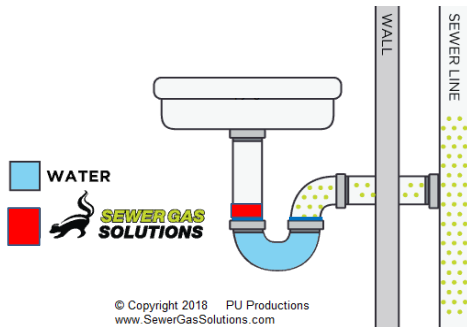
---

---

---

---

## Use This ...Evaporation Inhibitor




---

---

---

---

---

---

---

---

Use this...



- Patented evaporation inhibiting product addresses #1 preventable cause of sewer gas infiltration.
- Sewer Gas Solutions™ creates a non-toxic, long-lasting layer preventing evaporation of water in plumbing traps.
- [www.SewerGasSolutions.com](http://www.SewerGasSolutions.com)




---

---

---

---

---

---

---

---

# Causes of Sewer Gas Infiltration

## Besides Dry Traps

### Rapid fire photo montage



Outdoor Odors from Manhole Covers, Grease Traps, Clarifiers



Outdoor Odors from Broken Clean-Out Caps or Missing Clean Out-Caps



---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

### Roof to OA Intake Transfer from Sewer Vent Stacks (Entrainment)



---

---

---

---

---

---

---

### Sewer Gas, Vent Too Close to OA



- A reasonable temporary solution.
- Not a permanent fix.
- Fix is relocating the sewer vent away from the OA intake.



---

---

---

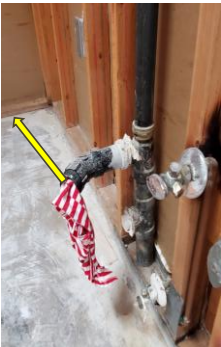
---

---

---

---

### Contractor's Sewer Plug (The Rag)



---

---

---

---

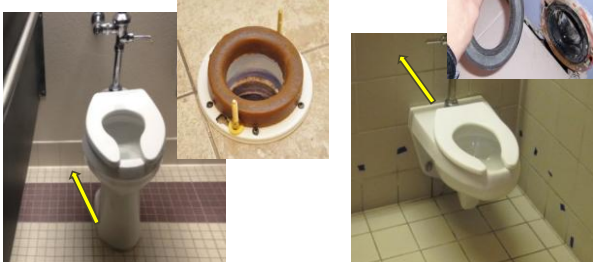
---

---

---

## Toilet Seals

- Toilets sit on top of a sewer opening we call a flange.
- The interface between the porcelain toilet and the hard sewer line needs a gasket of some sort.
  - Wax - Compressed Wax Ring on Floor Mount Toilets, or
  - Neoprene - Damaged Neoprene Rings on Saddle (wall) Mount



Sewer vents not clear of  
roof system elevation  
(Often following a roofing project)

or

Gapped Pb rain collar  
redirecting emitted  
sewer gas into the attic



[firstchoiceinspect.com](http://firstchoiceinspect.com) Temecula, CA

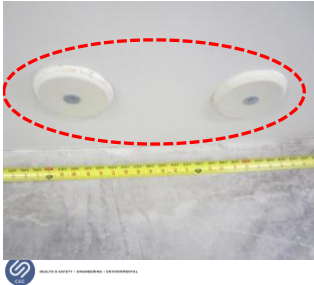


Condensate Drains Plumbed to Sewer



### What is a decorative sewer clean-out cap?

- Aesthetic cover for the access point for a plumber to clear drain line blockages (to snake, jet or inspect the sewer)




---

---

---

---

---

---

---

---

### Corroded Clean Out Cap Screws




---

---

---

---

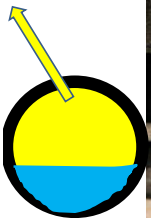
---

---

---

---

### Crack in cast iron drain in crawlspace Virtually Undetectable without smoke or DT




---

---

---

---

---

---

---

---

## Cracks in Cast Iron Sewer Vent Pipes in Wall

Virtually Undetectable without smoke or DT



# ASBESTOS

## Asbestos is Highly Regulated

- Compliance is Complicated
  - Federal US Laws
    - (OSHA, EPA, NESHAP, AHERA, etc.)
  - State Laws
    - (Utah Asbestos Rule [R307-801](#), Utah Dept. of Air Quality Asbestos Program)
  - County Laws
  - City or Fire Department Ordinances

# Asbestos

- Group Participation Question:  
–When was asbestos banned for use in the USA?



Common guesses will likely include:



- A. 1970
- B. 1975
- C. 1980
- D. 1985

And, the answer is...



Why have humans used asbestos for thousands of years?



- Fire & heat resistant
- High tensile strength
- Poor electrical conductor
- Impervious to chemicals
- Not biodegradable
- U.V. Resistant
- Good acoustical insulator
- Weavable
- It's cheap & abundant
  - Dig it up, smash it & add it to your product





What are some examples  
of materials in your  
buildings that are suspect  
for asbestos content?

## Rapid fire photo montage



Stucco



Siding



---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



Roofing Penetration Mastics,  
Composite Shingles, Rolled Goods,  
Roof Felts, Roof Tar...



---

---

---

---

---

---

---

---

Concrete



---

---

---

---

---

---

---

---

Cementitious exhaust flues,  
Water supply pipes...



---

---

---

---

---

---

---

---

Spray applied acoustic (popcorn)  
ceiling, lay-in ceiling panels...



---

---

---

---

---

---

---

Plaster, Drywall, Joint Compound, Wall  
texture, Paints...



---

---

---

---

---

---

---

Vinyl floor sheeting, vinyl floor tile...



---

---

---

---

---

---

---

### Glues, Adhesives, Putties...



- Glue Dabs
- Floor Tile Mastic
- Cove Base Adhesive



---

---

---

---

---

---

---

### Thermal system insulation (TSI)...



---

---

---

---

---

---

---

### Spray Applied Fireproofing...



---

---

---

---

---

---

---

## Vermiculite...

A presumed asbestos contaminated product




---

---

---

---

---

---

---

---

Duct tape, Duct seam mastic,  
Vibration dampeners...




---

---

---

---

---

---

---

---

## Pool Plaster




---

---

---

---

---

---

---

---

## What Contains Asbestos?

- The list is shorter when you ask “What building materials don’t contain asbestos”?
- Building materials are suspected to contain asbestos unless they are uncoated:
  - Glass
  - Metal
  - Wood




---

---

---

---

---

---

---

---



## Remove or Manage In Place?



- Leave it in place undisturbed and in good condition
- Asbestos is **not harmful** to your building’s occupants **unless it can be ingested or inhaled**
- Asbestos **becomes a hazard** during and after a **disturbance** such as:
  - Tenant Improvement      - Demolition/Renovation
  - Fire                              - Flood
  - Earthquake                  - Vandalism




---

---

---

---

---

---

---

---

## What should you do?

1. Assign an asbestos lead from your team.
2. Contract with a with an asbestos professional.
3. Preemptively inventory suspect homogeneous materials
4. List and presume all untested materials until you plan their disturbance and have them tested at that time
5. Preemptively test a few materials...
  - Materials you disturb during regular PM activities.
  - Materials a flood, fire or vehicle strike would impact.
  - For example , consider sampling :
    - Drywall Wall & Ceiling systems,
    - Spray Applied Acoustic Ceiling (SAAC),
    - Lay-In Ceiling Panels (T-grid tiles)
    - Vinyl Cove Base & Adhesive




---

---

---

---

---

---

---

---

## What should you do?

2. Inventory all suspect materials on site.
3. Presume all unsampled suspect materials.
  - Sample unsampled materials in conjunction with the planning of any capital improvements
  - Sample unsampled materials emergency arises.



WATER SAFETY PROGRAM (WSP) - 10/1/2023

**WATER  
INCURSION**  
Not a matter of if, but a matter of when



WATER SAFETY PROGRAM (WSP) - 10/1/2023

## 3 Categories of Water

- Category 1
  - Clean water: should not pose harm to humans (no chemical or biological concerns)
    - i.e.
      - Break in domestic water supply line
      - Rainwater falling from the sky
  - Drying affected contents & structure is an option
    - As is removal...if economics, schedule or other factors warrant

• Category 2

• Category 3



WATER SAFETY PROGRAM (WSP) - 10/1/2023

### 3 Categories of Water

- Category 1
- Category 2
  - Gray water: containing some degree of chemical, biological, and/or physical contamination
  - i.e.
    - Condensate pan overflow
    - Chiller pipe break
    - Toilet overflow with no waste contents
  - To be judged on a case-by-case basis

#### • Category 3

### 3 Categories of Water

- Category 1
- Category 2
- Category 3
  - Previously called “Black Water”: considered grossly unsanitary water, presumed to contain pathogenic agents and/or chemicals of concern
    - i.e.
      - Sewage backflow
      - Water main break (Cat 1) that contacts soil & enters the structure
  - Disinfection is not enough to kill potential pathogens or neutralize chemical contaminants
  - Drying porous materials is not an option
  - Remove affected porous contents & structure



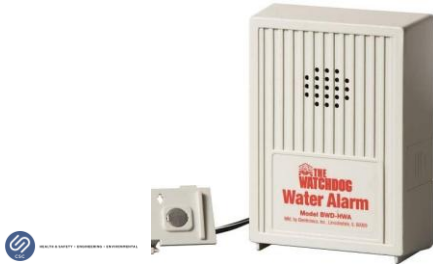
### You cannot stop the determined

- The tale of the infamous cloth napkin flusher



## Moisture Alarms

- Consider them in your areas of high moisture incursion potential  
–(cheap early warning option)

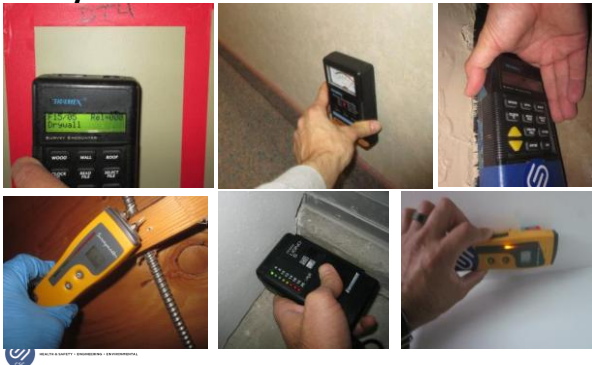


## What are moisture assessment tools & techniques?



Dry to the touch is not enough.

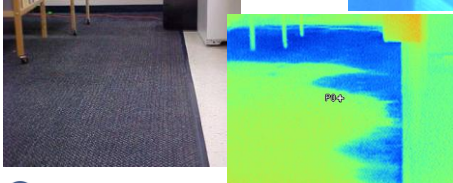
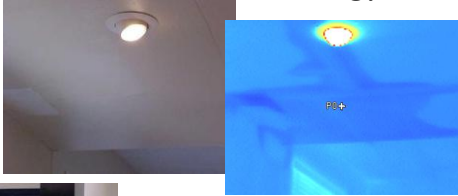
**Get your facilities team a moisture meter.**





## Water Detection Technology

Infrared Camera



---

---

---

---

---

---

---

## How not to dry



---

---

---

---

---

---

---

## Hire a pro and/or become one.



---

---

---

---

---

---

---

MOLD

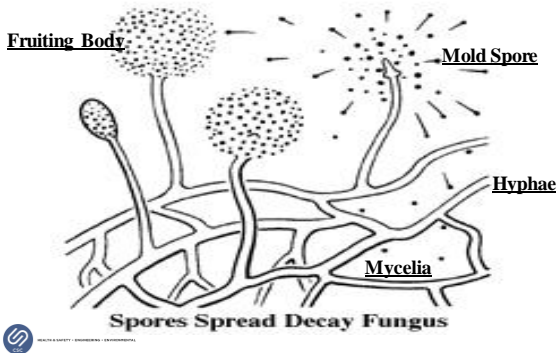


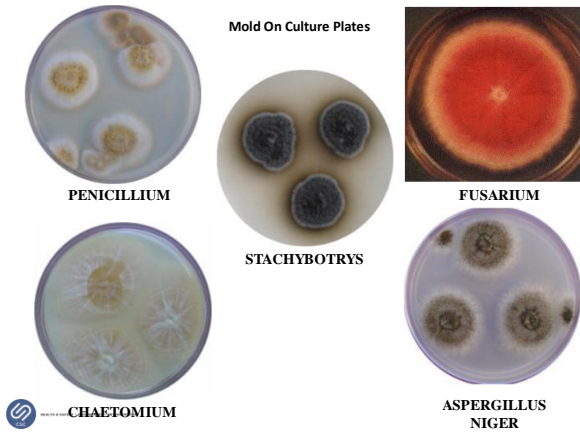
## •What is mold?

- (Fungus, Yeast, Mushroom, Mildew)?



### Microscopic Mold Diagram





---

---

---

---

---

---

---

---

### Mold Growth on Finished Drywall



---

---

---

---

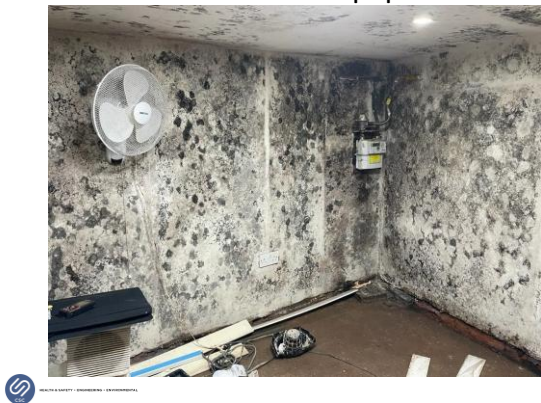
---

---

---

---

### That ain't wallpaper



---

---

---

---

---

---

---

---

## Rotten Food



---

---

---

---

---

---

---

---

## 3 Basic Requirements for Mold Growth

- Atmosphere
  - (temperatures you can survive in & available oxygen)
- Nutrient Source
  - (anything organic)
- Water
  - (the key to all life)

---

---

---

---

---

---

---

---

## FUNGI HEALTH EFFECTS

Common:

- **Irritation**
  - (itchy eyes, sneezing)
- **Allergy**
  - (headache, asthma attack)

Attorney Favorites:

- **Infection**
  - Dermatophytes (superficial & subcutaneous )
    - (toenail fungus, ring worms, athletes foot, thrush, yeast infection)
  - **Systemic mycoses**
    - (Aspergillosis, Coccidioidomycosis, Blastomycosis, Histoplasmosis)
- **Toxicosis**
  - Mycotoxins
    - Poison Mushrooms, Alcoholic Beverages, Magic Mushrooms
  - Microbial Volatile Organic Compounds (MVOCs)



---

---

---

---

---

---

---

---

### What is an Acceptable Environment When it Comes to Mold?

- No international mold laws
- No Federal “mold” laws.
  - US OSH 1970 General Duty Clause
  - Case Law
- No State “mold” laws Utah
  - (but there are in some states like FL & TX)
- Some municipal mold ordinances (NYC)




---

---

---

---

---

---

---

### What's an Acceptable Environment When it Comes to Mold?

- There are many state-of-the-art guidelines & consensus standards:
  - EPA, IICRC, ACGIH, AIHA, CDC, WHO, etc.




---

---

---

---

---

---

---

### What is an Acceptable Environment When it Comes to Mold?

- All generally accepted guidelines essentially say the “same” thing
  - Visible mold growth is unacceptable indoors in both accessible & inaccessible areas**
  - Airborne mold concentrations indoors should be both qualitatively & quantitatively similar to outdoors**




---

---

---

---

---

---

---

### Mold Myths

- Mold free?
  - No such thing. Molds are ubiquitous.
- Dangerous mold/ Safe mold?
  - All molds can be allergens, so no molds are “safe”
- Black mold?
  - Color is not an indicator of potency or impotency.



---

---

---

---

---

---

---

---

---

---

---

---

---

---

## Photo Montage



No matter how much you water your building,  
you don't get any additional square footage.



---

---

---

---

---

---

---

Indoor plants =  
water incursion, water damage & mold



---

---

---

---

---

---

---

---

Planters against your building =  
water incursion, water damage & mold



---

---

---

---

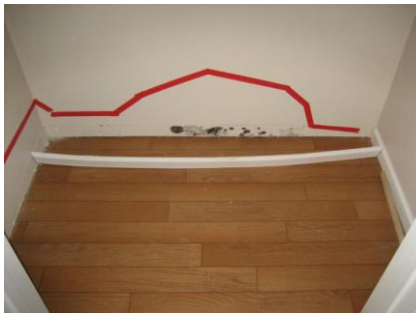
---

---

---

---

**Be aware of the potential for  
preexisting conditions**



---

---

---

---

---

---

---

---

Does this look like every LTC facility mechanical room?



---

---

---

---

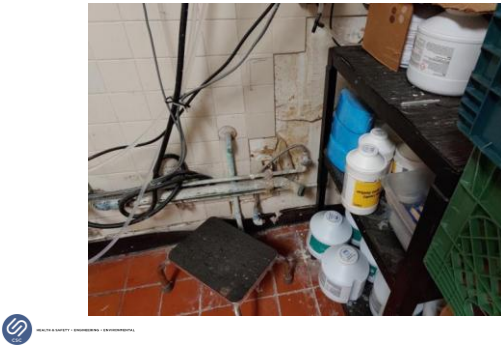
---

---

---

---

Does this look like every LTC facility kitchen dishwashing area?



---

---

---

---

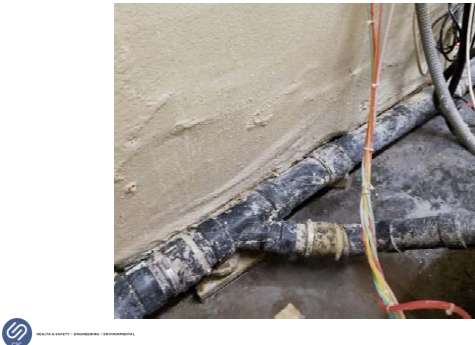
---

---

---

---

Does this look like every LTC facility laundry room?



---

---

---

---

---

---

---

---



Does this look like every LTC facility  
janitor's sink?



WATKINS & COMPANY - PROFESSIONAL - ENVIRONMENTAL

---

---

---

---

---

---

---

---

Understand impermeable layers work both ways  
(keep moisture out & keep moisture in)



WATKINS & COMPANY - PROFESSIONAL - ENVIRONMENTAL

---

---

---

---

---

---

---

---

I Hate Vinyl Wallpaper



WATKINS & COMPANY - PROFESSIONAL - ENVIRONMENTAL

---

---

---

---

---

---

---

---

### Keep laminated posters off walls



---

---

---

---

---

---

---

### Vinyl Cove Base Works the Same Way



---

---

---

---

---

---

---

### Destructive Testing is the Most Definitive Investigative Tool



---

---

---

---

---

---

---

# N95 Respirators



- Misunderstanding of PPE capabilities and use requirements are prevalent
- Masks are merely “Coughy” Filters or “Mobile Sneeze Guards”
- A KN95 is just a mask
- NIOSH N95’s are “Respirators” with the protection and all the obligations that implies



**An N95 Tight Fitting Filtering Facepiece is Subject to OSHA Respiratory Protection Standard 1910.134**



---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

For N95, ½ Face APR, Full Face APR, Tight Fitting PAPR,  
in brief you must have:

- **RPP**
  - A written Respiratory Protection Program (RPP)
- **Medical Release** (one time required, but annually is best)
  - A completed OSHA Respirator Medical Evaluation Questionnaire for each employee who will wear a respirator (see Appendix C)
  - Signed Medical Release from a Physician or Licensed Healthcare Professional (PLHCP), who reviewed the Questionnaire (and sometimes chooses to examine the employee)
    - Internal or outsourced (I recommend outsourcing employees with confounding factors)
- **Fit Testing (annual)**
  - Annual Fit Testing of each employee on every make/model/size respirator they will wear
- **Training (annual)**
  - Annual Respirator Training for each employee with focused on limitations, obligations, hazards, care & use of their specific respirator



UNIVERSITY OF MICHIGAN HEALTH SYSTEM

## 1910.134 Citations Are Common

- Violations of the Respiratory Protection Standard violations have historically made the top 5 list of issued OSHA citations, and are moving up the charts towards the #1 position
  - #5 in 2019
  - #3 in 2020
  - #2 in 2021
  - #3 in 2022
- 2021 there were 2,527 respiratory protection violations with >\$4 million in fines
  - Fines that divert resources from staff development, resident care, infrastructure improvement, etc.



UNIVERSITY OF MICHIGAN HEALTH SYSTEM

## Disposable Fit Test Hood



- Prevents the “ick” factor
- Protects against communicable diseases (e.g. COVID19)
- No waiting on the cleaning, disinfecting, dwell time, drying time needed for reusable hoods.
- Prevents false positives from odors of disinfectants
- Speeds sensitivity check & fit test
- Allows fit testing of multiple participants
- Available to purchase now
  - Call EMSL at 602-276-4344 and ask for the Product Manager, Chris
  - They will be available online shortly
  - Just \$5.00 for 3 hoods



UNIVERSITY OF MICHIGAN HEALTH SYSTEM

## There is no “Fit Test Guru” Certification

- Federal respiratory protection standard (29 CFR 1910.134) standard requires:
  - “Employer shall provide effective, comprehensive & understandable training to employees, who are required to use respirators at least annually.”
  - Implies individual conducting training must be competent in teaching the standards, use, care, limitations & other aspects of chosen respirators & use in their particular workplace
  - I can teach you to do it, I can do it for you or even better I can do BOTH.




---

---

---

---

---

---

---

---

## Better have a clean shaven staff




---

---

---

---

---

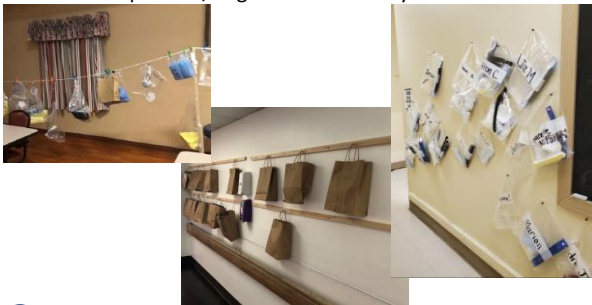
---

---

---

Austerity measures are a pandemic reality, but no liability reduction is provided.

Reuse of disposable/single use PPE is risky & **must end now**.




---

---

---

---

---

---

---

---

## Direct post-session questions to:

Derrick A. Denis

- Clark Seif Clark, Inc. (CSC)
  - [www.csceng.com](http://www.csceng.com)
  - [derrickdenis@csceng.com](mailto:derrickdenis@csceng.com)
  - T 480-460-8334
- Sewer Gas Solutions
  - [www.sewergassolutions.com](http://www.sewergassolutions.com)
  - [derrick@sewergassolutions.com](mailto:derrick@sewergassolutions.com)
  - M 602-757-8907




---

---

---

---

---

---

---

---

## Questions?

Preguntas

Вопросы

Domande

問題

Maswali

الأسئلة

imibuzo

mga tanong

Fragen

שאלות




---

---

---

---

---

---

---

---