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THE
YORK
WATER
COMPANY



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The York Water Company
Public Comments to the Environmental Quality Board
Regarding Proposed Rulemaking
(25 Pa. Code Chapter 109)
Disinfection Requirements Rule
(46 Pa. B. 857)
March 24, 2016

The York Water Company does not support the Department's efforts to amend Chapter 109 as put forth in the Disinfection Requirements Rule. The chlorine residual chosen (0.2-mg/L), the removal of HPC as an alternative compliance criteria, and the actual costs associated with compliance are major sticking points.

However, The York Water Company does support the USEPA in its exhaustive, investigative, science driven FACA process (Federal Advisory Committee Act) <http://www.gsa.gov/portal/content/104514> that directly involves stakeholders, regulators, legislators, and experts in related fields, to evaluate and define the efficacy of possible changes to regulations. The EPA is presently investigating whether a disinfection requirement type rule is necessary on the federal level.

The Preamble to the Proposed Disinfection Requirements Rule is, unfortunately, inaccurate and misleading on many points. The majority of these inaccuracies have been pointed out to the Department but still remain as part of the Preamble. The Preamble also details the "justifications" for this proposed regulatory package and The York Water Company disagrees with the majority of these 'drivers' or 'justifications', as they stand. The York Water Company disagrees with the notion that waterborne disease outbreaks in PA are attributed to or even directly related to Community Water Systems (CWS) that are meeting present regulations. The US-CDC identifies Premise plumbing and untreated well systems as the two largest root causes for waterborne disease outbreaks (79%), not Community Water Systems. Under the proposed Disinfection Requirements Rule compliance rates with the Total Coliform Rule (TCR / RTCR) will not improve by any statistically significant measure, however, an increase in violations of Disinfection By-Products should be expected, as detailed in Tables #1 and #2 (*below*) utilizing the data shown in the charts in the Preamble (*pgs. 863 - 868*) and in item #28 of the Regulatory Analysis Form. Additionally, the ease of compliance estimates have been dramatically overestimated and the cost projections to comply with this package are hugely understated.

The Department is proposing to not only increase the required disinfectant residual by ten times (10X) but it is also aiming to remove an alternative compliance criteria that has been part of Chapter 109 for many years, as well as expanding the number and type of sampling locations required to determine compliance, and is increasing the frequency at which those samples must be drawn. The York Water Company disagrees with the removal of HPC (*Heterotrophic Plate Count*) as an alternative compliance criteria for a low chlorine residual situation.

The TAC Board has voted 12-to-0 (*1-abstention*) to retain the HPC requirement as an alternative compliance criteria in cases of low chlorine residual. Interestingly, the Department seems poised to ignore a near



unanimous vote from the TAC Board. Strangely enough, the Department has chosen to retain HPC as an alternative compliance criteria ONLY for bottled, bulk, vended and retail water systems. HPC should remain as an alternative compliance criteria for all water systems, not just a select few.

HPC has been used in conjunction with Total Coliform Sampling and distribution system chlorine residual as part of a 'packaged' set of information for years. Part of this package is used for compliance determination but the other part is used as an informative tool for water systems to strategically target their personnel and resources. Total coliform sample results are utilized as an indicator of possible contamination in a system, HPC is used to gauge microbiological growth and growth-potential in the system, and Chlorine residual readings are used to gauge the amount of 'suppressant' available to limit bacteriological regrowth and combat potential contaminations. Using these tools together, one is able to view a more complete picture of distribution system health.

The lack of a chlorine residual, while not an ideal situation, is not indicative of any danger nor of the presence of a contaminant. However, there are situations where a sample has a healthy chlorine residual, there are no coliforms, but the HPC shows bacteriological growth. This system needs to do some work in the areas surrounding their sampling location to address the bacteriological growth and growth potential before it develops further. If we remove HPC, not only will utilities stop paying to analyze HPC and thus will not be able to utilize it as the informative tool (*and a potential alternative compliance criteria*), but it will also lead to many more unnecessary violations and public notifications (*low residual*) that were not linked to any direct health threats or any indications of potential bacteriological growth in the distribution system. Also, excessive public notification actually causes the customer-base, at-large, to ignore or disregard the important public notices. Effectively the public will believe that the water supplier/PADEP has "Cried 'Wolf'", too many times and will ignore boil water or do not consume notifications. A scenario that nobody wants to face.

The Department has not provided sufficient evidence of a *need* to remove HPC as an alternative compliance criteria. To make a significant change to an existing regulation, the Department should clearly define an overwhelming need and provide evidence that not only is the change merited, but also cost effective. It seems that these factors, specifically in regards to HPC, have not been fully addressed in this package. Additionally, the removal of HPC as an alternative compliance criteria, especially in light of the other very significant changes recently made (*RTCR*) or are being proposed as part of this regulatory package, makes estimations of potential compliance too variable to accurately estimate.

Lastly, the removal of HPC as an alternative compliance criteria in conjunction with the elevated chlorine residual has another potential unintended consequence; dramatically increasing the civil liability of the water supplier. Even if a water supplier is meeting the proposed regs everywhere in their system, there will come a time when an individual will look to blame an entity with deep pockets for their being sick or a relative passing. The removal of HPC and leaving suppliers with a single compliance criteria, chlorine residual, makes water utilities a prime target for frivolous civil lawsuits.

Improper determination of chlorine residual can be done by a customer via a "pool-kit" or test-strips at any faucet inside a facility (*even those with internal treatment, softeners, filters, etc...*) and if it shows lower than the proposed 0.2-mg/L and there are no alternative compliance criteria, then there is a dramatically



increased likelihood of a civil lawsuit being filed and actually making it to court. Claims would be made that since the water did not meet the residual at their particular faucet, then the water supplier is civilly liable for their problems/sickness/loss or other. The HPC test, while still readily available to the populous, acts as a screening tool limiting the number of potentially frivolous lawsuits that would otherwise develop as a result of removing it.

In conclusion, we want our water systems focusing on water treatment, water quality, and conveyance; not on defending themselves in court from frivolous lawsuits – especially in cases where the suppliers are truly meeting the regs.

1) **Premise Plumbing is:**

- a. Separate and different from the Distribution System as defined by the US. Centers for Disease Control and Prevention (CDC)**.
- b. Something that only small water systems can or do claim any private plumbing (*premise plumbing*) as part of distribution system (~9% of population served)*
- c. An area that the Medium and Large CWS CANNOT legally touch, operate, or maintain (*Medium and Large Water Systems provide public water to 91% of the population served in PA*)
- d. One of the two leading deficiencies associated with waterborne disease outbreaks (*Legionella in particular*) 66% Premise Plumbing – **NOT DISTRIBUTION SYSTEMS**, per the CDC**. <http://www.cdc.gov/nimwr/preview/mmwrhtml/mm6431a2.htm>
 - i. 66% Premise Plumbing
 - ii. 13% Untreated groundwater

2) **Dramatically Overestimates ease of compliance and Dramatically Underestimates costs associated with achieving compliance.**

- a. Monthly Average chlorine residuals cannot mathematically aid in the prediction of potential compliance
 - i. Proposed Regs determine compliance based upon individual results
 - ii. *Theoretical Example (Extreme): 120-monthly samples required*
 - 60-of those samples = 2.00-mg/L and
 - 60-of those samples = 0.02-mg/L
 - **Monthly average = 1.01-mg/L – this is reported to the Dept. under present regs**
2. Based on the new reg, the PWS would be out of compliance 60 times in the first month (*below 0.2-mg/L but still meets present regs*)
3. Based on the Dept's choice of math for projections, this system expects no capital expenditures (*no flushers & no chemical booster necessary*) and thus has no concerns as its average residual is well over the proposed 0.2-mg/L – excepting the fact that the utility would be in "violation" 720-times in the first year.
4. Overall ease of compliance projections are severely overestimated by the Dept.
- b. Actual costs to achieve compliance are much higher than the Dept.'s predictions
 - i. Automated Flusher capital cost estimated at **\$2,000** each, by the Dept.



- ii. The Philadelphia Water Dept. has published estimates for their system, their cost for purchasing, installing, and securing each flusher is **\$45,000**
 1. This is greater than an order of magnitude difference
 2. **Even if** the actual costs worked out to be halfway between (\$23,500) – the Dept.’s estimated costs are **dramatically** understated – still “off” by an order of magnitude.
 3. The number of flushers needed, statewide is dramatically underestimated.
 - a. More than three systems need flushers
 - b. Much more than the Dept’s estimated \$30,000 will be spent by the medium and large water systems on flushers.
 - iii. Operating costs are NOT accounted for in the Dept.’s cost projections.
 1. Nearly all medium and large water systems operating costs will increase
 2. The York Water Company projects annual operating cost increases, just to comply with the 0.2-mg/L proposed residual at **\$200,000/yr.**
 3. The Philadelphia Water Dept. projects its operating costs to increase by **\$2,500,000/yr. (\$2.5-million/yr.)** to comply with the proposed residual of 0.2-mg/L.
 4. The Dept. estimates a total combined cost, statewide at \$780,000
- 3) There is no scientific, obvious, or overwhelming need for this very expensive reg. package.**
- a. What is the actual driver for this proposed reg. package?
 - i. 5-pages of the Preamble focus on Legionella and Legionnaires Disease (LD)
 1. Elevated residuals in a distribution system will not completely remove or destroy Legionella
 2. Legionella must amplify in order to cause harm
 3. Legionella amplification is a premise plumbing problem and is NOT a distribution system issue – per the CDC
 4. I cannot identify a single PA waterborne disease outbreak within the past 20-years that has been directly attributed to a medium or large PWS that has been disinfecting AND meeting the present regs. (91% of PA’s population served)
 - ii. 5-pages of the Preamble are dedicated to Total Coliform Rule (TCR) and Disinfection Byproduct Rule (DBP) compliance. *(see Tables #1 and #2 below)*
 1. Based on the dataset, PA cannot expect a significant increase in TCR compliance – 0 – 1.3% better is possible
 2. Based on dataset, PA can expect DBP violations to increase by 0.4 to 4.1%.
 - iii. 1-page is dedicated to costs and compliance estimates
 1. Estimates are dramatically skewed
 2. Cost estimates are too low per item
 3. Cost estimates are too low statewide
 4. Ease of Compliance projections is dramatically overestimated
 - b. Cost / benefit? Especially for Large and Medium PWS (91% of PA population served)



- i. No science based nor statistical 'guarantee' of any benefits
- ii. Capital and Operating Costs go up dramatically
- iii. Customer Costs increase
- iv. DBPs increase (*cancer and other health effects*)
- v. Complaints go up
- vi. Violations go up

Tables #1 & #2: TCR and DBP Violation Summary Analysis from Data in Preamble (as seen in bar charts pgs. 863 – 866)

Table #1 indicates that, based on states that have increased the mandatory chlorine residual in their distribution system to >0.2-mg/L, PA should expect no statistically significant improvement in TCR compliance rates, should the required minimum residual be increased to 0.2-mg/L. Note that for this analysis, less than one standard deviation (stdev. ≤ 1) difference is indistinguishable from background noise. Greater than one standard deviation indicates a 'true' difference.

Total Coliform Rule (TCR) Violation Summary Utilizing Data from Bar Charts Presented in the Preamble (pages 863 - 866)										
Percentage of Community Water Systems with TCR Violations During the Years: FY2011 through FY2014										
Comparing PA violations vs. that of states with mandatory residuals >0.2-mg/L										
State	Pennsylvania	Alabama	Tennessee	West Virginia	Illinois	Kentucky	Kansas	North Carolina	Ohio	
Summary: PA should be able to expect 0 - 1.3% better TCR compliance rates with elevated distribution system residual. 3-states slightly better than PA (avg 1.2% better compliance rates) 3-states effectively the same as PA 1-state worse than PA (14% worse)	Required Residual (Total/Free in mg/L)	0.02/0.02	0.5/0.2	0.2/total	0.2/total	0.5/0.2	0.5/0.2	10/10.2	10/10.2	10/10.2
	FY 2011	2.9	0.9	2.9	0.6	1.9	4.9	2.9	1.9	1.2
	FY 2012	2.6	2.4	3.9	0.9	1.9	4.1	3.2	1.1	1.0
	FY 2013	2.0	2.3	1.0	1.8	1.6	2.8	3.1	1.1	1.1
	FY 2014	2.1	1.7	1.8	1.7	1.6	3.8	3.4	0.8	1.5
	Average Percent Violations Reported	2.4	1.8	1.7	1.1	1.6	3.8	3.1	1.1	1.2
	Std Deviation of Violations	0.94								
	Average Difference from PA		0.6	0.7	1.3	0.8	1.4	0.7	1.3	1.2
			Same as PA	Same as PA	Better than PA	Same as PA	Worse than PA	Same as PA	Better than PA	Better than PA

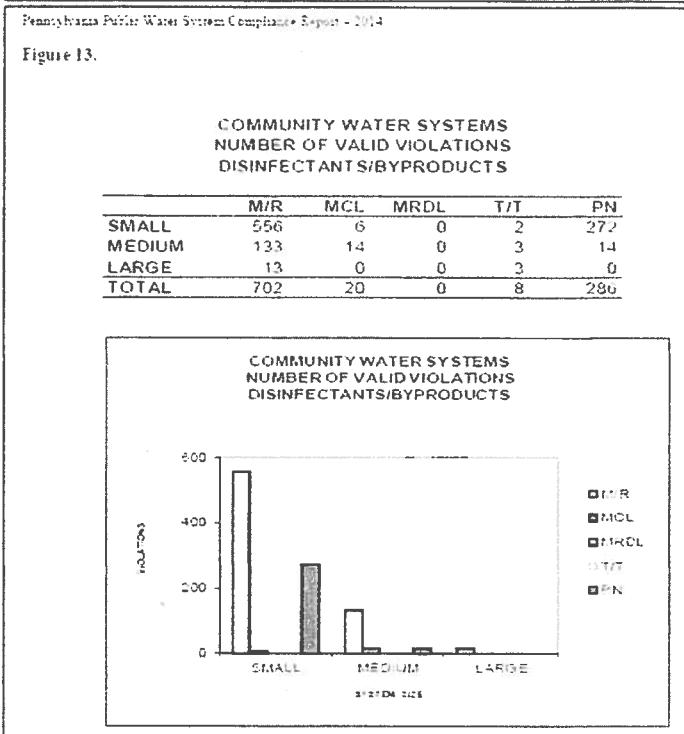
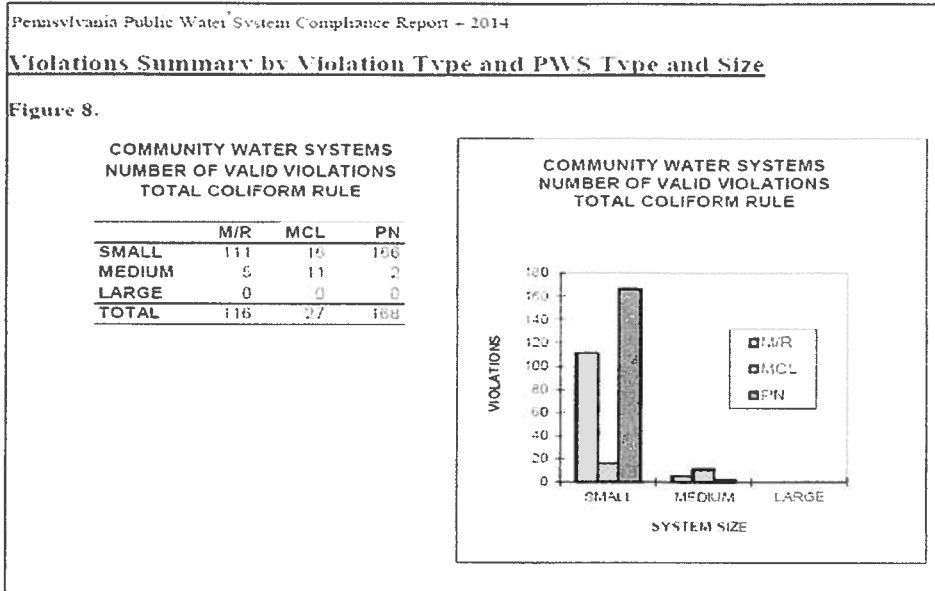
Disinfection Byproduct (DBP) Violation Summary Utilizing Data from Bar Charts Presented in the Preamble (pages 863 - 866)										
Percentage of Community Water Systems with DBP Violations During the Years: FY2011 through FY2014										
Comparing PA violations vs. that of states with mandatory residuals >0.2-mg/L										
State	Pennsylvania	Alabama	Tennessee	West Virginia	Illinois	Kentucky	Kansas	North Carolina	Ohio	
Summary: PA should be able to expect 0.4 - 4.1% worse DBP compliance rates with elevated distribution system residual. 0-states better than PA 4-states effectively the same as PA 4-state worse than PA (0.9 - 4.1% worse)	Required Residual (Total/Free in mg/L)	0.02/0.02	0.5/0.2	0.2/total	0.2/total	0.5/0.2	0.5/0.2	10/10.2	10/10.2	10/10.2
	FY 2011	2.2	0.9	3.8	2.2	0.9	6.6	1.9	2.0	2.1
	FY 2012	1.2	0.2	2.7	1.2	0.9	2.8	1.4	1.9	1.5
	FY 2013	0.9	2.9	1.7	1.0	0.4	2.0	1.2	1.6	1.4
	FY 2014	0.7	1.7	4.2	4.2	1.2	10.0	2.4	1.9	3.2
	Average Percent Violations	1.3	1.7	3.1	2.2	0.6	5.4	1.7	1.8	2.1
	Std Deviation of Violations	0.73								
	Average Difference from PA		0.40	1.85	0.90	0.70	4.10	0.43	0.55	0.80
			Same as PA	Worse than PA	Worse than PA	Same as PA	Worse than PA	Same as PA	Same as PA	Worse than PA

Table #2 indicates that PA should expect an increase in DBP violations, based upon the data from states that have increased their mandatory minimum distribution system chlorine residuals to >0.2-mg/L.

For the amount of money that the medium and large suppliers are going to have to spend (*and rate increases for customers*), the regulated community and rate payers should expect better returns on their investments.



Tables #3 and #4: Violations Summary of TCR and DBPs. Note the distribution of 2014 violations for small systems vs. medium and large systems





The Preamble states, *“It is anticipated that the large majority of water systems will be able to comply with this requirement with little to no capital costs. According to Department Records for the last 3 years (2012-2014):”*. This statement is so impressively imprecise it ends up being very misleading.

- 1) Large and Medium Systems make up only 4.6% of the total water systems in PA,
- 2) Large and Medium Systems will need to spend *massive* amounts of money (*details to follow later this week*) in order to comply with this proposed reg. package. (*approximately two orders of magnitude greater than the Dept.’s cost projections*)
- 3) Large and Medium Systems supply water to 91% of the population served by community water in PA.

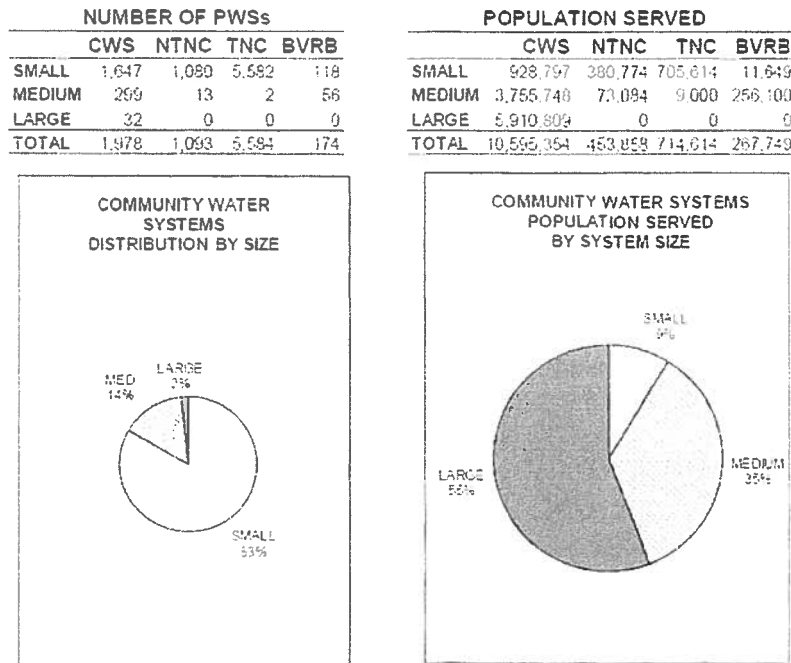
***Documentation:** Large and Medium Sized Community Water Systems (CWS) population distribution.

- 1) Large Water Systems account for 0.4% of the total number of systems in PA.
- 2) Medium Water Systems account for 4.2% of the total number of systems in PA.
- 3) Large and Medium Systems supply water to 91% of the population served by CWS within PA.

Source: http://files.dep.state.pa.us/Water/BSDW/DrinkingWaterManagement/PA_DEP_2014_Annual_Compliance_Report.pdf

PWS Profile

Figure 2. Number of Pennsylvania Systems and Population Served by Size Category





** <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6431a2.htm> The CDC documents that Legionella outbreaks are associated with “*building plumbing*” and further clarifies that “*plumbing refers to the pipes that are within a building or within a service line leading to a building, distinguished from the distribution system of pipes that compose the water supply.*” - Please see following screenshots from CDC, Morbidity and Mortality Weekly Report (MMWR) for details

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Morbidity and Mortality Weekly Report (MMWR)

Surveillance for Waterborne Disease Outbreaks Associated with Drinking Water – United States, 2011-2012

Weekly
 August 14, 2015 / 64(31):842-848

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Advances in water management and sanitation have substantially reduced waterborne disease in the United States, although outbreaks continue to occur (1). Public health agencies in the U.S. states and territories* report information on waterborne disease outbreaks to the CDC Waterborne Disease and Outbreak Surveillance System (<http://www.cdc.gov/healthywater/surveillance/index.html>). For 2011–2012, 32 drinking water-associated outbreaks were reported, accounting for at least 431 cases of illness, 102 hospitalizations, and 14 deaths. Legionella was responsible for 66% of outbreaks and 26% of illnesses, and viruses and non-Legionella bacteria together accounted for 16% of outbreaks and 53% of illnesses. The two most commonly identified deficiencies[‡] leading to drinking water-associated outbreaks were Legionella in building plumbing[§] systems (66%) and untreated groundwater (13%). Continued vigilance by public health, regulatory, and industry professionals to identify and correct deficiencies associated with building plumbing systems and groundwater systems could prevent most reported outbreaks and illnesses associated with drinking water systems.

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6431a2.htm>

* Outbreaks are assigned one or more deficiency classifications based on available data. (<http://www.cdc.gov/healthywater/surveillance/deficiency-classification.html>).

‡ “*plumbing*” refers to the pipes that are within a building or within a service line leading into a building, distinguished from the distribution system of pipes that compose the water supply.

<http://www.cdc.gov/healthywater/burden/need-for-estimate.html>

Premise Plumbing: as defined by the CDC

Premise plumbing is the drinking water system that is inside housing, schools, and other buildings. It connects to the main drinking water distribution system, but the water utility does not monitor its safety. A large proportion of drinking water outbreaks are linked to pathogens that grow in premise plumbing and building water system parts—like hot water tanks, cooling towers, decorative fountains, shower heads, and water taps—and are inhaled through steam or aerosol ¹⁻⁵

References



Haupt TE, Heffernan RT, Kazmierczak JJ, Nehls-Lowe H, Rheineck B, Powell C, Leonhardt KK, Chitnis AS, Davis JP. An outbreak of Legionnaires' disease associated with a decorative water wall fountain in a hospital. *Infect Control Hosp Epidemiol.* 2012; 33(2):185-91.

1. Falkinham JO 3rd. Nontuberculous mycobacteria from household plumbing of patients with nontuberculous mycobacteria disease. *Emerg Infect Dis.* 2011; 17(3):419-24.
2. Falkinham JO 3rd. Hospital water filters as a source of *Mycobacterium avium* complex. *J Med Microbiol.* 2010; 59(Pt 10):1198-202.
3. Tobin-D'Angelo MJ, Blass MA, del Rio C, Halvosa JS, Blumberg HM, Horsburgh CR. Hospital water as a source of *Mycobacterium avium* complex isolates in respiratory specimens. *J Infect Dis.* 2004;189(1):98-104.
4. Fields BS, Benson RF, Besser RE. *Legionella* and Legionnaires' disease: 25 years of investigation. *Clin Microbiol Rev.* 2002;15(3):506-26.

<http://www.cdc.gov/legionella/about/causes-transmission.html>

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Legionella (Legionnaires' Disease and Pontiac Fever)

Legionella Home

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Causes and Common Sources of Infection

Legionella is a type of bacterium found naturally in fresh water. When people are exposed to the bacterium it can cause illness (Legionnaires' disease and Pontiac fever). This bacterium grows best in warm water, like the kind found in:

- Hot tubs
- Cooling towers (air-conditioning units for large buildings)
- Hot water tanks
- Large plumbing systems
- Decorative fountains

Cooling towers use water to remove heat from a process or building. They are often part of the air conditioning systems of large buildings. In contrast, home and car air conditioning units do not use water to cool, so they do not aerosolize water (spread small droplets of water in the air) and are not a risk for *Legionella* growth.

Exposure and Transmission

People are exposed to *Legionella* when they breathe in mist or vapor (small droplets of water in the air) containing the bacteria. One example might be from breathing in droplets spread from a hot tub that has not been properly cleaned and disinfected.

Language: English ▾

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Legionnaires' disease NOT spread from one person to another person



Microbiological Water Quality in the Distribution System and Premise Plumbing: Legionnaires' Disease

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Corona Environmental Consulting, LLC
Chief Scientist

Presented to the Small Systems TAC Pennsylvania DEP
26 May 2015

Factors that Make Premise Plumbing Unique (NAS, 2006)

- High SA to V ratio
- Materials
- Water age
- Extreme temperatures
- Low to no disinfectant residual
- Bacterial regrowth
- High variable velocities
- Proximity to service lines
- Cross connections
- Aerosol exposure



Conclusions

- LD is preventable (US CDC)
- Effects of DW treatment cannot control *Legionella* because the bacteria reproduce in PP
- Control of *Legionella* and LD happens in the building, not in the DW distribution system (DS)
- National effort ongoing on many fronts to address this issue of PP WQ with the goal of controlling LD

http://www.paawwa.org/wp-content/uploads/2015/12/P6_Clancy.pdf

Premise Plumbing Challenges: High Surface Area to Volume Ratio

- ~10 times more surface area per unit length compared to mains
- ¼ of the total surface area in the DS
- <2% of the total volume of water in the system
- The greater surface area increases microbial growth, chemical leaching and ultimately higher disinfectant residual decay rates

National Academy of Science 2006

CORONA ENVIRONMENTAL CONSULTING

Sincerely,

Douglas J. Crawshaw
Water Quality Manager
The York Water Company