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Bacterial Risk in Commercial Buildings

Recent Testing confirms the presence of dangerously high levels of bacteria within the Premise Piping of various buildings with Low or No Use during the recent pandemic

Nationwide, buildings subjected to shutdowns or reduced utilization have shown a deterioration in their water quality when returning to pre-pandemic schedules. This decline in quality has been traced to stagnant water within the buildings. Recent testing by RETEGO® Labs has shown dangerously high bacterial contamination levels ($>10^6$ cfu/mL, gross contamination) within various building plumbing systems.

Although certain bacteria are always present in municipal water, they are typically controlled by the residual chlorine in the city's distribution system. In unused and under-used buildings, stagnant organic material and bacteria can rapidly overcome residual chlorine and allow the growth of biofilm that could harbor pathogens. At this level of contamination, simply flushing the piping may not be sufficient and if not properly addressed, will threaten the health and safety of the water users.

Buildings that may be affected include hospitals, care centers, churches, schools, office buildings, or literally any building, anywhere, that had limited use during the shutdown.

Last summer, in anticipation of re-opening the economy, the US EPA and the CDC issued the following guidance for all properties affected by the shutdown:

“Building and business closures for weeks or months reduce water usage, potentially leading to stagnant water inside building plumbing. This water can become unsafe to drink or otherwise use for domestic or commercial purposes. For example, optimal growth conditions for undesirable pathogens, such as Legionella bacteria, can occur when hot water temperatures decrease and disinfectant residuals (e.g., chlorine) drop to low levels. Water chemistry changes may also increase corrosion and leaching of metals, including lead, and may cause the formation of disinfection by-products. Turning on the water for immediate use after it has been stagnant can pose a risk to public health if not properly managed. Additionally, turning on water after a prolonged period of non-use could disrupt pipe and plumbing scales to such an extent that microbial and chemical contaminants could be released into the water.”

In January of 2021 the CDC issued their Legionella Toolkit that is “designed to help people understand which buildings and devices need a Legionella water management program to reduce the risk for Legionnaires’ disease, the key elements of a water management program, and how to develop it.” This Toolkit can be found online at:

<https://www.cdc.gov/legionella/wmp/control-toolkit/index.html>

A key component to the CDC Toolkit is the reference to the ASHRAE 12-2020 Guideline which is designed to help in reducing the risk of dangerous levels of bacterial growth in buildings:

“4.2.2.2 Growth. *Biofilms play an important role in Legionella growth. Biofilms are complex and dynamic microbial ecosystems that form on surfaces within the building water systems. Biofilms impair the effectiveness of physical and chemical control methods, such as maintaining hot-water temperatures and applying chemical disinfectants. Legionella bacteria are known to invade and replicate within protozoa that are associated with biofilms. While inside these protozoa, the Legionella bacteria are further shielded from disinfectants and temperature extremes.*

Key factors that contribute to Legionella growth include sediment, temperature, water age, and disinfectant residual.”

The “Biofilms” as described by this section are occurring at an alarming rate within our communities, even though recent testing of local water sources and distribution systems found that all municipal systems were operating with adequate and appropriate levels of disinfection.

Cities and local water operators are following the national guidelines, but building owners and managers are generally not, and this is mostly due to a lack of knowledge that they are responsible for the quality of the water in their building (not the city or county).

While working to identify and fix bacterial problems, RETEGO® has found that in all cases of contamination, the Residual Chlorine level in the building was non-detectable, indicating high Chlorine Demand in the building. This simple and cost-effective testing enables quick and easy prediction of where problems may occur and help us to confirm if the treatment steps have been successful.

We strongly advise all property owners, managers and concerned parties to familiarize themselves with the national guidelines and take immediate steps towards controlling the bacterial biofilm levels in their buildings. Proactive testing along with smart treatment can avoid a potential disaster.

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Reference Material:

US EPA:

INFORMATION ON MAINTAINING OR RESTORING WATER QUALITY IN BUILDINGS WITH LOW OR NO USE (JULY 2020)

<https://www.epa.gov/coronavirus/information-maintaining-or-restoring-water-quality-buildings-low-or-no-use>

MAINTAINING OR RESTORING WATER QUALITY IN BUILDINGS WITH LOW OR NO USE (May 2020)

https://www.epa.gov/sites/production/files/2020-05/documents/final_maintaining_building_water_quality_5.6.20-v2.pdf

RESTORING WATER QUALITY IN BUILDINGS FOR REOPENING – CHECKLIST (May 2020)

https://www.epa.gov/sites/production/files/2020-05/documents/final_checklist_for_maintaining_building_water_quality_5-6-2020.pdf

US CDC:

Guidance for Reopening Buildings After Prolonged Shutdown or Reduced Operation (September 2020)

<https://www.cdc.gov/coronavirus/2019-ncov/php/building-water-system.html>

(The CDC Link above contains additional information from ASHRAE, CTI, US EPA and the AWWA on this subject.)

Toolkit for Controlling Legionella in Common Sources of Exposure (January 2021)

<https://www.cdc.gov/legionella/wmp/control-toolkit/index.html>

ASHRAE:

ASHRAE Publishes Updated Legionella Guideline (May 29, 2020)

<https://www.ashrae.org/about/news/2020/ashrae-publishes-updated-legionella-guideline>

Guidance to Help Minimize the Risk of Legionellosis

[ANSI/ASHRAE Standard 188-2018, Legionellosis: Risk Management for Building Water Systems](#)