



August 31, 2023

Gregory Wilson, Manager
City of Lock Haven
20 E. Church St.
Lock Haven, PA 17745

Dear Mr. Wilson,

Thank you for meeting with us to discuss the water testing results from your building's cooling tower. The waterborne team discussed these results and put together some information and recommendations for *Legionella* control. **Please be aware that the remediation recommendations provided in this letter includes additional actions beyond what has already been completed.** We recommend working with an environmental consultant who is experienced in *Legionella* remediation to assist in completing these steps.

***Legionella* Bacteria:**

Legionella bacteria is found naturally in freshwater environments, such as lakes and streams. *Legionella* becomes a health concern when the bacteria grows and spreads in building water systems. *Legionella* grows best in temperatures between 77-113°F. There are several factors that can promote *Legionella* growth in building water systems, such as:

- Biofilm, scale, and sediment
- Fluctuations in water temperature and pH
- Inadequate levels of disinfectant
- Changes in water pressure
- Water stagnation
- Construction or renovations
- Water main breaks
- Changes in municipal water quality

People can become sick if they breathe in small water droplets that contain *Legionella* bacteria, especially if a person has a compromised immune system or an underlying lung condition. *Legionella* can cause [Legionnaires' disease and Pontiac fever](#), collectively known as legionellosis.

Common symptoms of legionellosis include fever, cough, and shortness of breath. Those who develop symptoms and think they may have been exposed should consult with their doctor and let them know about potential exposure to *Legionella*. Asymptomatic individuals do not need to be tested for *Legionella*.

Control Measures:

The CDC developed a comprehensive toolkit for the remediation of *Legionella* in cooling towers (<https://www.cdc.gov/legionella/wmp/control-toolkit/cooling-towers.html>). CDC recommends the following procedures:

1. **Review** the current water treatment program (e.g., cleanliness, maintenance, disinfectant program).
 - If a water treatment program is not already in place, refer to the CDC's resource for developing a program (<https://www.cdc.gov/legionella/downloads/toolkit.pdf>).
2. **Remove** heat load from the cooling system. Shut off fans associated with the cooling tower. Disengage all automated chemical feed and control equipment.
3. **Shut off** system blowdown and keep make-up water valves open and operating.
4. **Close** building air intake vents near the cooling tower, especially those downwind, until after the cleaning procedure is complete.
5. **Circulate** water through all system equipment, including any bypass or standby components.
6. **Add** an oxidizing disinfectant sufficient to achieve a disinfectant residual of at least 20 ppm as free available oxidant.
7. **Add** an appropriate dispersant and apply antifoam, if needed. Apply appropriate corrosion inhibitors.
8. **Reduce** the cycles of concentration (if necessary) to achieve and maintain a pH of less than 8.0 for chlorine-based disinfectants or less than 8.5 for bromine-based disinfectants.
9. **Maintain** a free available oxidant residual of 10 ppm for a minimum of 24 hours. Shorter contact times can be effective at higher concentrations.
10. **Drain** the system after the disinfection period to the sanitary sewer, following all applicable rules, regulations, and permits that may be required.
11. **Physically clean** all accessible system equipment. Consideration should be given to all cooling tower equipment, including fill pack, drift eliminators, equalizer lines, remote sumps, basins, strainers, chillers, free cooling heat exchangers, and any bypass or standby components.
12. **Refill** the system and circulate water through all system equipment including any bypass or standby components.
13. **Add** an oxidizing disinfectant and maintain a free available oxidant residual of at least 10 ppm for one hour.
14. **Drain** the system after the disinfection period to the sanitary sewer following all applicable rules, regulations, and permits that may be required.
15. **Refill** the system and return all chemical feed and control equipment to normal operation.

It is recommended that you implement the following prevention measures:

- You are strongly encouraged to hire a private water consultant with *Legionella* expertise in building water systems to perform the CDC's recommended remediation listed above. Refer to CDC's tips for working with such consultants (<https://www.cdc.gov/legionella/wmp/consultant-considerations.html>).
- After remediation is performed, additional environmental sampling should be completed to confirm the elimination of *Legionella*. Post-remediation samples should be collected at least 48 hours after the water system or device has been restored to normal operating conditions.

- If the cooling tower is offline, individuals can immediately resume using the building while awaiting remediation and follow-up testing. Normal use of the facility and cooling tower can resume after one round of negative tests are collected at least 48 hours after remediation. Once normal operation is resumed, it is recommended that you continue monitoring and performing regular maintenance of the cooling tower. Although there is not a safe level of *Legionella*, a building is considered well-controlled if specific parameters are met as outlined by the CDC (<https://www.cdc.gov/legionella/wmp/control-toolkit/routine-testing-figure-01.html>).
- Consider environmental sampling in additional areas of the building including showers, fountains, or sinks to test for *Legionella*. The environmental sampling plan should be consistent with CDC's suggested sampling procedure and sampling sites (<https://www.cdc.gov/legionella/downloads/cdc-sampling-procedure.pdf>) with regards to:
 - Types of samples: both biofilm swabs and bulk water samples should be collected.
 - Measurement of water parameters: temperature, pH, and chlorine should be documented for every sampling site.
 - Types of sampling sites: incoming water main, hot water heater(s), hot and cold water returns, multiple sinks, multiple showers, cooling towers, etc.

Long-term Control Measures:

- You should develop or consider revising an existing water management program (<https://www.cdc.gov/legionella/wmp/overview.html>).
- If the root causes of *Legionella* growth are not identified and controlled, *Legionella* growth is likely to reoccur. Follow-up sampling should continue at the facility, regardless of the initial results of the post-remediation environmental samples. The specific sampling approach can vary according to the circumstance. One common approach recommends collecting environmental samples for culture at 2-week intervals for 3 months. If you do not detect *Legionella* in cultures during 3 months of monitoring at 2-week intervals, you should collect cultures monthly for another 3 months.
- Implement *Legionella* control measures for cooling towers as described in the CDC's resource for controlling *Legionella* in cooling towers (<https://www.cdc.gov/legionella/wmp/control-toolkit/cooling-towers.html>).

Please refer to the following resources for more info on *Legionella*:

- PADOH *Legionella* website and fact sheet (www.legionellosis.health.pa.gov)
- CDC *Legionella* website (www.cdc.gov/legionella)
- CDC water management program toolkit (www.cdc.gov/legionella/wmp/toolkit)
- CDC toolkit for controlling *Legionella* in common sources of exposure (www.cdc.gov/legionella/wmp/control-toolkit)

The Pennsylvania Department of Health is responsible for protecting the health of the people in the Commonwealth, in the manner it determines is most efficient and practical for disease prevention and suppression, pursuant to the Administrative Code of 1929 (71 P.S. § 531 et seq.) and the Disease Prevention and Control Law of 1955 (35 P.S. § 521.1 et seq.). The Department is also authorized to

investigate questions affecting the security of life and health in any locality and may enter and examine places and things within the Commonwealth, without hindrance, and may investigate any case or outbreak of disease that it deems to be a potential threat to public health (71 P.S. § 532 and 28 Pa. Code § 27.152).

We appreciate the opportunity to work with you and your staff throughout this process. If you have any questions regarding this notice, please do not hesitate to contact Betsy Negrón at elnegron@pa.gov or 717.712.9252.

Thank you for your time and attention.

Sincerely,

A handwritten signature in blue ink, appearing to read 'SMW', with a long, sweeping horizontal line extending to the right.

Sharon Watkins, PhD
State Epidemiologist
Director, Bureau of Epidemiology