



# Jaytech, Inc. E-Newsletter

“A candid conversation about water treatment issues facing today’s mechanical engineers.”

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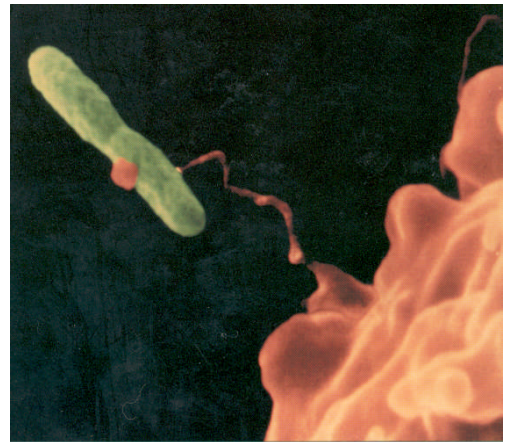
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## Legionnaires’ Disease: A Practical Approach

Legionnaires’ disease is the severe pneumonia caused by *Legionella pneumophila*, which, left untreated, has a 12-16% case-fatality ratio. Serological evidence (presence of antibodies in blood) suggest the *L. pneumophila* is also the cause of Pontiac fever, a non-pneumonic, flu-like illness that is not life threatening. Although many people exposed to legionella bacteria remain well, development of illness depends upon the individual’s immune status, general state of health and several other unknown factors.

“*Legionella*” is a new genus of bacteria discovered in 1977, which currently contains 39 species representing 54 serogroups. Approximately 50% of known legionella species have been found to cause disease in humans. *Legionella* appears to be aquatic bacteria, occurring in surface waters, such as rivers, lakes, streams, and ponds. Some researchers in Britain and at the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia are exploring the hypothesis that the host for legionella bacteria in nature may be protozoa, one-celled animals.



Protozoa might shield these fastidious organisms from adverse environmental conditions such as unfavorable weather and perhaps even biocides. When conditions improve, protozoa may function as natural amplifiers, permitting in vivo proliferation of legionella bacteria.

Transmission of legionella bacteria to humans has been traced to contaminated cooling towers, evaporative condensers, decorative fountains, water walls, and domestic water systems. For cooling systems, the vehicle of transmission appears to be inhalation of aerosol drift generated by contaminated units. Contaminated tap water in respiratory therapy devices and humidifiers, and aerosols from showerheads served by contaminated hot water tanks have also been implicated as sources of legionnaires’ disease.

## Helpful Links

[www.cdc.gov](http://www.cdc.gov)

[www.nih.gov](http://www.nih.gov)

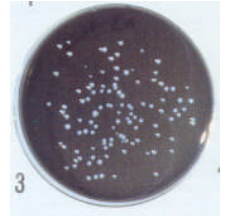


American Water Works Association  
The Authority on Water



A test report stating the presence of *Legionella pneumophila* or other *Legionella* species means that a lab has grown these microorganisms on culture media from a water sample. Although small numbers of legionella bacteria probably pose a minimum risk to healthy, immunocompetent individuals, *corrective action should be kept in mind whenever legionella bacteria are isolated from a water sample*. The risk to humans depends on the virulence of the isolate, the quantity of organisms to which a host is exposed, and the immune status of the person.

Although the scientific community cannot agree on what number of legionella bacteria is acceptable, we believe colony counts, as expressed in Colony Forming Units (C.F.U.s) per ml of water, can be used as a loose guide for deciding when to implement corrective action. Laboratory procedures that suppress the growth of normal cooling tower bacteria (contaminants) and enhance the detection of *Legionella* species result in a loss of viability of some legionella bacteria. For this reason, *colony counts only approximate the actual number of Legionella bacteria in a water specimen*. Colony counts may be interpreted as follows.



- >100 C.F.U.s/ml = large number of legionella bacteria.
- 10-100 C.F.U.s/ml = moderate number of legionella bacteria.
- <10 C.F.U.s/ml = small number of legionella bacteria.

Although the elimination of legionella bacteria is the desired goal, complete destruction of these organisms often proves to be difficult. *Controlling the population of legionella bacteria may be a more realistic goal*. By control, we mean minimizing the multiplication of legionella bacteria and reducing their numbers to levels as low as possible without damaging the cooling system.

Recommendations for frequency of testing cooling systems for legionella bacteria are empirical. Testing a system before it is put into service for the season is highly recommended. A number of outbreaks have been associated with the start up of cooling systems after a period of dormancy. Three additional tests (e.g., one sample every 4-6 weeks per sump) distributed over the cooling season may be used to monitor the efficacy of the maintenance program. Staggered sampling is necessary to ascertain the microbial status of a cooling tower. Obviously, more frequent testing of towers demonstrating legionella bacteria is recommended to monitor the success of corrective action measures.

The Health and Safety Commission's approved code of practice states: "The risk from exposure to legionella should be prevented or controlled; precautions include maintaining the cleanliness of the system and the water in it."

### Section 130:

"In addition to the routine sampling for aerobic bacteria, the routine monitoring scheme should also include periodic sampling for the presence of legionella bacteria. This should be undertaken **at least quarterly**, unless sampling is necessary for other reasons, such as to help identify possible sources of the bacteria during outbreaks of legionnaire's disease. More frequent sampling should be carried out when commissioning a system and establishing a treatment program. Sampling should be carried out, on a monthly basis, until it can be shown that the system is under control..."

Aggressive microbicide treatment of contaminated cooling systems appears to be successful in controlling legionella colonization. The elimination (or control) of legionella bacteria from a cooling tower is often a challenging task and may require multiple biocide "shock" treatments and/or the addition of biodispersants. Many times complete destruction of legionella bacteria in an infected tower proves to be quite difficult. Since legionella bacteria can survive in a biofilm matrix, and perhaps even be protected within protozoan cysts, controlling the population of legionella microorganisms may be a more realistic goal.

Any person working directly in the mist of a cooling tower or other aerosol-producing device or where airborne concentrations of legionella bacteria are likely (e.g., power washing the inside of a cooling tower) should wear a personal protective respiratory device. The state of Wisconsin recommends a full or a half mask equipped with a (HEPA) filter or a "Type H" high efficiency filter capable of filtering aerosols, mists, and particulates. Combination HEPA and chemical cartridges are available which offer protection from airborne chlorine levels up to 10ppm in air. Workers should be advised that filters must be replaced frequently as prolonged use of respirators in mist may cause loss of effectiveness as well as resistance to breathing.

For more information on Legionnaires' disease, generally accepted practices, biodispersants, and effective water treatment programs, contact your local Jaytech representative or contact me at [mjuhl@jaytech.com](mailto:mjuhl@jaytech.com)

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**Updated Web Site!** Take a moment and check out the latest version of the Jaytech web site at <http://www.jaytech.com>. You can now access all technical and Material Safety Data Sheets online 24 hours a day. While you're there, take our short water treatment quiz and win a prize!

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## Next Issue:

Understanding the Legionella Conundrum – Dr. James Watson, MCS Inc.

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## In The News:

### **City to Audit Cooling Towers**

Christchurch, New Zealand – The city plans to create a registry of all air-conditioning cooling towers after a recent outbreak of legionnaires disease that has affected 18 people, 3 of whom have died.

### **World Biocide Demand Expected to reach \$6.9 billion by 2009**

Cleveland, Ohio – A new report from Freedonia Group Inc. projects that world biocide demand should grow 5.4% yearly reaching \$6.9 billion in 2009. The study predicts that North America and Western Europe will account for more than two-thirds of the demand.



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## Have an idea?

If you have an idea or question you would like more information about, send me e-mail at [mjuhl@jaytech.com](mailto:mjuhl@jaytech.com) and I'll answer it! Remember, it must be water treatment related and be of interest to other professionals such as you.

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