

PHYSICS DIVISION

ESH BULLETIN 2004-09

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COOLING TOWERS, GUIDANCE FOR WORKING IN, ON, OR AROUND

Legionnaires' disease – Symptoms and sources of infection

<http://sbms.ornl.gov/sbms/sbmsearch/SubjArea/RP/RPsa.cfm>

Legionnaires' disease is an infection caused by exposure to Legionella bacteria. Legionella bacteria are very common in our environment at low levels and can be found in rivers, ponds and soil. Air conditioning cooling towers and warm water systems can provide a warm, supportive environment conducive to growth well beyond normal environmental levels. The presence of other water based organisms, such as amoeba, algae and other bacteria within these environments can provide greater nutrient levels further enhancing growth of Legionella.

Legionnaires' disease is a type of pneumonia caused by Legionella pneumophila, one of 39 species of Legionella bacteria. It takes between two to ten days for symptoms to appear. Symptoms include malaise, headache, chills, rapid onset of high fever, cough, and other influenza-like symptoms. Legionnaires' disease can be a life threatening disease.

Pontiac Fever, also caused by Legionella bacteria, is a milder, non-pneumonic disease which is considered non-life threatening. Symptoms are similar to influenza and recovery usually occurs within 2-5 days.

Recommended Control Measures – When working in, on or around cooling towers

There is insufficient information to determine what is a “safe” number or an “unsafe” number of *Legionella* bacteria that will not cause the disease. Due to this uncertainty, the following safeguard is

recommended for working in or around cooling towers to ensure that ORNL staff is not exposed to the bacteria that cause Legionnaire's disease.

Personal Protective Equipment

Activities performed inside or on top of operating cooling towers call for use of disposable coveralls with hood, protective gloves, half or full face respirator with appropriate cartridge and goggles (if half face respiratory is worn) and slip resistant footwear. Uncoated disposable coveralls and leather work gloves should be changed as they become saturated or damaged.

No additional control measures are needed when short duration activities (cutting grass, walking past a tower, etc.) are conducted adjacent to an operating cooling tower other than those control measures identified through the work control process for the specific activity.

No additional control measures are needed to conduct activities in a dry cooling tower (where no aerosols are present or will be generated) other than those controls identified through the work control process may be required.

Note: If moisture accumulates in the respirator filter to the extent that breathing becomes difficult, -workers should leave the area immediately and change filters before returning to the work area. If moisture accumulation in air purifying respirators is an ongoing problem, workers should consider using a supplied air apparatus to complete the task. Any exceptions should be discussed with the division safety officer or the OSSD field safety representative prior to the beginning of work..

Administrative and Engineering Controls

Cooling towers, evaporative condensers, and fluid coolers should be properly monitored and maintained according to manufacturers' recommendations to prevent buildup of scale, sediment, and bio-fouling. Visual inspection and periodic maintenance of the system are the best ways to control growth of *Legionella* and related organisms. Chemical biocides when used according to manufacturers recommendations, are a very effective method of controlling *Legionella* growth. High concentrations of organic matter and dissolved solids in the water will reduce the effectiveness of any biocidal agent. Other methods to control

Legionella growth include, but are not limited to: minimize spray generated and limit drift of water vapor, maintaining sump water at lower temperatures, frequent visual inspections and periodic cleaning of cooling towers, etc.