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LEGIONELLA EXPOSURE CONTROL PLAN

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I. PURPOSE

It is the policy of Reed College to take precautions to eliminate potential hazards in the workplace. The purpose of this Legionella Exposure Control Plan is to specify the standard practices to be used by Reed College to prevent legionellosis associated with building water systems. Legionellosis refers to two illnesses associated with legionella bacterium. When the bacterium Legionella causes pneumonia, the disease is referred to as Legionnaires' disease. Legionella can also cause a less severe influenza-like illness known as Pontiac Fever. Most all cases of legionellosis are the result of exposure to Legionella associated with building water systems.

The presence alone of Legionella bacteria in building water systems is not sufficient to cause legionellosis. Other factors including environmental conditions, water temperatures, biofilms, etc. and a means of transmitting the bacteria to people in the building via aerosol generation are necessary to cause outbreak of disease as a result of exposure. Legionellosis is contracted via inhalation of Legionella bacteria. Disease is not transmitted person-to-person and susceptible persons are more at risk for legionellosis including, but not limited to, the elderly, dialysis patients, and persons with weakened immune systems.

II. SCOPE

The scope of this program outlines the following:

- Potential risks and preventative measures associated with building water systems.
- Responding to a legionellosis case/outbreak through environmental sampling and water treatment.
- Disinfection methods for the various types of building water systems within a facility.

III. RESPONSIBILITIES

A. REED COLLEGE ADMINISTRATION

The President and other Officers of Reed College have ultimate responsibility to provide support for take action measures to reduce contaminants in Reed's building water systems.

B. ENVIRONMENTAL HEALTH AND SAFETY (EHS):

- Development and maintenance of the Legionella Exposure Control Plan.
- Record keeping of test results and remedial steps taken, if necessary.
- Advise in remedial steps for the presence of excess Legionella bacteria in the building water systems above OSHA guidance.

C. FACILITIES SERVICES

- Schedules quarterly building water system testing.
- Advise in remedial steps for the presence of Legionella bacteria in the building water systems.
- Makes necessary repairs or corrective action measures if Legionella bacteria is detected.

• Provides preventative maintenance to the buildings water systems and treatment.

IV. QUARTERLY BUILDING WATER SYSTEM TESTING

Reed College performs quarterly water system testing of the Chemistry cooling tower for the presence of Legionella bacteria. Water samples are taken and sent to a laboratory in Portland to test for the presence of Legionella bacteria. If Legionella is found, corrective actions steps are taken and the cooling tower is re-tested. Corrective action measures include a heavy shock the system with an oxidizing biocide such as bleach. Follow-up testing is done approximately five days after heavy shock

V. INTERRUPTATION OF WATER SYSTEM TESTING RESULTS

Analytical results are reported as "Not Detected" if no *Legionella* are cultured, or results are reported as colony forming units (CFU) of *Legionella* per milliliter of sample if *Legionella* are detected. The following table provides a brief explanation.

According to Legionelle Not Detected (No Remedial Action Required) for Disease Control a	d Prevention, "there is degionelia Detected (Remedial Action Recommended) amount	
of Legionella in the water and the risk for disease, and therefore there is	no safe level of <i>Legionella</i> in a water system."2 When the bacterium is	
Continue regular monitoring of the systems to verify system mechanical and operational conditions do not a favor Legionella growth. A result of "Not Detected" may refer to one of the following scenarios:	The presence of any species of Legionella warrants corrective action. Refer to OSHA Guidance and Supplemental Action described below for further guidance.	
 No <i>Legionella</i> were present in the sample, however, <i>Legionella</i> maybe present elsewhere in the system. <i>Legionella</i> may have been present but detection was impaired due to inhibiting organisms or masked by high levels of contamination (non- legionella organisms). <i>Legionella</i> died in transit. <i>» Legionella</i> was undetected via culture procedure (viable but non-culturable; VBNC). 	 Analytical results are reported as: Total Legionella (includes all detected species) Legionella pneumophila Serogroup1(onlySG1) LegionellapneumophilaSerogroups2-14 (combined) Other Legionella species (total non-pneumophilia species) Fluorescent Legionella (reported if detected) 	
A "Not Detected" culture result does not mean there are "zero" <i>Legionella</i> present in the sample or that the system is absent of <i>Legionella</i> .	The reporting of fluorescent or blue-white <i>Legionella</i> is a subgroup of "Other <i>Legionella</i> species" and are rarely associated with human infection. There are about 46 non-pneuomophila species of which only a few are fluorescent under UV light at 365-nm. The most common fluorescent species include <i>L. anisa</i> *, <i>L. bozemanii</i> *, <i>L. cherrii, L. dumoffii</i> *, <i>L. gratiana, L gormanii</i> *, <i>L. parisiensis</i> *, <i>L. steigerwaltii, and L. tucsonensis</i> . * This species has been associated with human infection. Individual species account for less than 3% of infections.1	

Absence of *Legionella* are not necessarily equivalent to low risk, and as described by ASHRAE Guideline 12, the presence of *Legionella* cannot be used in isolation to determine the risk of legionellosis. 3 The bacterium is frequently present in water systems without being associated with known cases of disease. In addition, there are multiple factors that can influence risk of illness. These factors include, but are not limited to, strain virulence, host susceptibility, and how efficiently the organisms are aerosolized to the small particle size required to reach the deep portion of the human lung and remain viable. *Legionella* testing should be performed and interpreted within the context of

a properly designed *Legionella* Water Management Plan, and testing is not a substitute for sound mechanical and operational maintenance and when necessary chemical treatments.

OSHA GUIDANCE

The presence of any species of *Legionella* warrants remedial action. The following table provides guidance for facilities located in the United States of America as interpreted from the OSHA Technical Manual.4 The AHJ, other company policies, or the site specific management plan shall superceed where appropriate. Implementation of a full comprehensive hazard assessment and a management plan for the control of health related risk associated with *Legionella* in building water systems is recommended. **Re-sample for** *Legionella***, generally within 2 to 7 days post remediation, to verify and document corrective measures taken were successful.**

Action Level	Cooling Water	Domestic Water	Humidifier Water	Recommended Action
A	100 or less	10 or less	1 or less	Acceptable control. No remedial action required
В	More than 100 and up to 1,000	More than 10 and up to 100	More than 1 and up to 10	Prompt cleaning and/or biocide treatment of the system.
С	More than 1,000	More than 100	More than 10	Immediate cleaning and/or biocide treatment. Take prompt steps to prevent employee exposure.

Colony Forming Units (CFU) of Legionella per Milliliter

VI. CORRECTIVE ACTION HISTORY

Date	Location	<u>Results</u>	Corrective action taken	Follow-up test results
6/30/16	q2 cooling tower	340 cfu/ml=fluorescent	full shock using chlorine	Received 8/8/16 Not detected