

Health and Safety Management Procedure

PROCEDURE: Control of *Legionella* bacteria at the University of Sussex

Department: All
 Application : All University-controlled buildings
 and relevant activities
 Author: Health and Safety Office
 Approved by: Health and Safety Committee May 27 2010

Version: 1
 Issue date: V1.2 at May 27 2010

PURPOSE:

To define the responsibilities and procedures for managing the control of *Legionella* bacteria within University of Sussex water systems and equipment, to demonstrate compliance with legal requirements, and to ensure effective management of risk.

SCOPE:

This Management Procedure forms part of the University Health and Safety Policy and applies to all areas of activity associated with the University. This Procedure applies to all staff, students, contractors and all University of Sussex controlled premises and activities

AIMS :

The aims of this Safety Management Procedure are :

- i. to safeguard anyone who may be affected by *Legionella* within or close to any University of Sussex premises
- ii. to ensure an effective management system is in place, including monitoring and review
- iii. to adopt the principles of control and management as specified in HSE publication : Approved Code of Practice – ‘*The Control of Legionella Bacteria in Hot and Cold Water Systems (ACoP L8)*’
- iv. to manage the potential contamination of water systems
- v. to enable the University to comply with its legal duties by :
 - a) identifying and assessing sources of risk
 - b) preparing a scheme prevent and control risk
 - c) implementing, managing and monitoring all precautionary control measures identified
 - d) considering alternative systems or processes designed to eliminate any risks
 - e) keep records of precautionary measures
 - f) identifying the responsibilities of any employee or contractor.

PERSONS RESPONSIBLE

Director of Estates and Facilities Management	Provision of effective systems and resources
Head of Maintenance	Implementation of procedures
Director of Health and Safety	Provide advice, guidance, act as liaison
Heads of Schools	Implementation of Procedures
Employees	Implement Procedures/follow instructions
Research Staff	Implement Procedures/follow instructions
Students	Implement Procedures/follow instructions
Contractors	Implement Procedures/follow instructions

EFFECTS & ACTIONS ON NON-CONFORMANCE:

If this procedure is not applied it will result in:

- i. Failure to ensure a safe system of work, safe working environment, effective risk management.
- ii. Failure to implement the University Health and Safety policy
- iii. Risk of legal action from the Regulatory Authorities for failing to comply with the statutory requirements – failure to comply with the Approved Code of Practice L8 is in itself regarded as an offence
- iv. Damage to the reputation of the University.

CHANGES TO THE PROCEDURE

VERSION	REASON FOR THE CHANGE	DATE
1.0	Original document	April 2010
1.2	Amends after HS&E Committee	27 May 2010

Health and Safety Management Procedure

Control of *Legionella* bacteria at the University of Sussex

CONTENTS

1. Introduction	4
2. Background	4
3. Legal Requirements	4
4. Scope and Purpose	4
5. Aims	5
6. Application	6
7. Roles and Responsibilities	6
8. Arrangements	7
9. Training	9
10. Records	9
11. Audit	10
12. Emergency Procedures	10
Further Information	11
Appendix 1	
- Temperature Monitoring	12
Appendix 2	
- Inspection Frequencies for Risk Systems	
1. Hot and Cold Water Systems	13
2. Other risk Systems	13

1. INTRODUCTION

The University of Sussex has a general legal duty to protect the health, safety and welfare of staff, students, visitors and general public. Under this duty, and the duty to prevent exposure to hazardous substances, the University must manage the potential for contamination of water systems by *Legionella* bacteria (*Legionella pneumophila* – the cause of the illness known as ‘Legionnaire’s disease, or Legionellosis).

The University will adopt the principles of control and management identified in the Health and Safety Commission (HSC) publication : Approved Code of Practice and Guidance document ‘*The Control of Legionella bacteria in Water Systems L8 (ACoP L8)*’ Second Edition. HSE Books 2000 ISBN 0 7176 1772 6.

2. BACKGROUND

Legionnaire’s disease is a potentially fatal form of pneumonia which can affect anybody, but which principally affects those who are susceptible because of age (over 45), illness, immune-suppression, smoking. Infection is caused by inhaling small droplets of water contaminated with the bacterium *Legionella pneumophila*, and other related bacteria. The less serious illnesses of Pontiac Fever and Lochgoilhead Fever, which are not fatal or permanently debilitating, can also be caused by these bacteria.

Legionella bacteria are common in rivers and ponds, and may contaminate and grow in other water systems such as wet cooling towers, and hot and cold water services. They can survive low temperatures, and thrive at temperatures between 20 °C and 45 °C if sufficient nutrients are present, but are killed by temperatures above 60 °C.

On average there are 200-300 reported cases in England and Wales each year, the majority of which are treated successfully with antibiotics. The incubation period on average is 2-10 days, but can be much longer.

Legionnaire’s disease cannot be transmitted from person-to-person.

3. LEGAL REQUIREMENTS

The University has a duty to ensure, so far as reasonably practicable, the health, safety and welfare of any person who may be affected by activities carried on by it, or any appointed agent. In respect of managing *Legionella* in the workplace, the legal standard is set by ‘The Control of *Legionella* bacteria in Water Systems, Approved Code of Practice L8’ (ACoP L8) (Second edition, HSE Books)

The requirements of the standard are to :

- i. identify and assess sources of risk
- ii. prepare a scheme for preventing or controlling the risk
- iii. implement, manage and monitor the scheme – appointing a ‘repsonsible person’
- iv. keep records, and
- v. provide information, instruction and training.

4. SCOPE AND PURPOSE

This Safety Management Procedure forms part of the University Health and Safety Policy and applies to all areas of the University. The purpose of the document is to define the responsibilities and procedures for managing the control of *Legionella* contamination of University water systems.

5. AIMS

The aims of this Safety Management Procedure are :

- i. to adopt the principles of control and management specified in ACoP L8
- ii. to eliminate the potential for *Legionella* contamination of water systems in order to prevent any danger
- iii. to assist the University in complying with legal duties by
 - a. identifying and assessing sources of risk from *Legionella*
 - b. preparing a scheme of for preventing or controlling the risk
 - c. implementing, managing and monitoring all precautionary control measures identified
 - d. considering alternative systems or processes designed to eliminate any risks
 - e. keeping records of precautionary measures
 - f. identifying the responsibilities of staff, students, contractors and visitors

6. APPLICATION

This Safety Management Procedure applies to the control of *Legionella* bacteria in water systems in which there is a means of creating and dispersing water droplets that may be inhaled, and so causing a reasonably foreseeable risk of exposure to *Legionella* bacteria.

The following are relevant systems covered by this Procedure :

- i. water systems incorporating a cooling tower
- ii. water systems incorporating an evaporative condenser
- iii. hot and cold water systems
- iv. other plant and systems containing water which is likely to exceed 20°C and which may release a spray of aerosol (ie a cloud of droplets) during operation or when being maintained

Location of Systems/Equipment/Services at the University :

Cooling Towers/Evaporative Condensers – none identified

Hot and Cold water systems – all occupied buildings

Other Plant and Systems - showers, drenching showers, hose pipes, fire hoses, fire hydrants, baths, basins and sinks, taps, spray-taps, horticultural irrigation and misting systems, ornamental ponds and fountains, humidifiers, lather and machine tool cutting fluids, dead-legs at vending machines, ice-making machines, glass/dish washers.

Any system, plant, equipment or service introduces at a School or Departmental level remains the responsibility of the School or Department, in order to comply with the requirements of this Safety Management Procedure.

7. ROLES AND RESPONSIBILITIES

7.1 Director of Estates and Facilities Management

The Director of Estates and Facilities Management is responsible to University Council for ensuring that effective systems and resources are in place and available for the control and management of *Legionella* in relation to the University's water systems.

The Director of Estates and Facilities Management will :

- i. take managerial responsibility for the implementation of precautions to prevent the proliferation of *Legionella* bacteria within the University's water systems
- ii. ensure the development, maintenance and implementation of a written scheme for controlling the risks of exposure to *Legionella* bacteria
- iii. appoint a Responsible Person (*Legionella*) – the Estates Maintenance Manager
- iv. chair a 'Legionella Risk Management Team' which will monitor and advise on the implementation of this Safety Management Procedure

7.2 University Responsible Person (*Legionella*)

The Estates Maintenance Manager will undertake the roles and responsibilities of the Responsible Person (*Legionella*) and shall have such experience, instruction, information , training, competence, and resources to carry out duties competently and safely.

The Responsible Person (*Legionella*) shall:

- i. know the potential sources and the risks arising from *Legionella* bacteria
- ii. know the control measures and precautions necessary to protect any people concerned, and their significance
- iii. know the measures to be taken to ensure such controls remain effective
- iv. ensure that systems are designed to comply with the HSC publication 'The Control of *Legionella* bacteria in Water Systems, Approved Code of Practice L8' (ACoP L8) (Second edition, HSE Books)
- v. ensure that only competent and skilled staff undertake any testing, monitoring, maintenance, design, alteration or installation of water systems
- vi. know where to access competent help to assess the risks of exposure to *Legionella* bacteria in relation to University water systems.
- vii. Undertake competency checks, monitoring and control of contractors with respect to control of *Legionella* bacteria in water systems.

7.3 Competent Persons (*Legionella*)

Competent Persons (*Legionella*) will only work on University water systems where the testing, monitoring, maintenance, design, alteration or installation activities have been approved and authorised by the University Responsible Person (*Legionella*), ensuring that their activities limit or prevent the conditions conducive to the proliferation of *Legionella* bacteria.

7.4 Director of Health and Safety

The Director of Health and Safety is responsible for developing procedures and guidance for the control and management of health and safety, and shall be responsible for reviewing this Management Procedure on a regular basis, and participating in compliance audits

7.5 Heads of Schools

The Heads of Schools are responsible to the Vice-Chancellor for the control and management of health and safety in relation to the undertakings and work activities of their School.

This responsibility extends to any system or equipment where there is a reasonably foreseeable risk of *Legionella* growth (see Section 6 of this document). Appropriate monitoring, cleaning and maintenance procedures must be implemented and responsibility must be allocated to appropriate persons within the School.

8. ARRANGEMENTS

8.1 Risk Assessments

The Director of Estates and Facilities Management will appoint a qualified and competent specialist to enable the University Responsible Person (*Legionella*) to assess risks arising from the water systems which are considered to present a reasonably foreseeable risk of causing exposure to *Legionella* bacteria.

The risk assessment should include (but should not be limited to) the potential for bacterial growth, potential exposure to persons, the identification of any person at risk, and the necessary control measures, including any means of creating and disseminating breathable droplets, aerosol or nuclei.

These will include the source of supply water, for example whether mains or not, possible sources of contamination of water supply, and operational details of plant and equipment including procedures in the event of breakdown.

The completed risk assessment will be subject to regular review, at least annually, and whenever there is reason to believe that the original risk assessment may no longer be valid.

The risk assessment will be completed following a detailed site survey of the water systems, and the creation of a description of the water system design, a schematic drawing of water systems within buildings, and a written assessment of the management risks, and the control measures needed. The completed risk assessment will be retained within the Estates and Facilities Department.

8.2 Control Methodology

The risk from exposure will normally be controlled by measures which do not allow the proliferation of *Legionella* bacteria in the system and reduce exposure to water droplets and aerosols. Precautions will include the following :

- i. Controlling the release of water spray
- ii. Avoiding water temperatures and conditions that favour the proliferation of *Legionella* bacteria and other micro-organisms
- iii. Avoiding water stagnation
- iv. Avoiding the use of materials that harbour bacteria and other micro-organisms, or provide nutrients for microbial growth
- v. Maintaining the cleanliness of the system and water in it
- vi. Possible use of water-treatment techniques as appropriate
- vii. Action to ensure the correct and safe operation and maintenance of the system.

Estates and Facilities Management will specify, schedule, design, monitor and report on all controls necessary to manage *Legionella* bacteria within the University water systems.

The Responsible Person (*Legionella*), will ensure that Water Systems Log Books are produced for each building or group of buildings on campus.

The Log Books will be held within the Estates and Facilities Management offices and will contain :

- i. Risk assessment for the system
- ii. Description of system design
- iii. Schematic diagrams of the system
- iv. Records of control measures adopted and checks made
- v. Chlorination record certificates
- vi. Records of any remedial work required/carried out
- vii. Records of monitoring and auditing

The Water Systems Log Book will guide those with responsibilities for water systems in building through all possible installations that may be under their control so that, if the various sections are completed with the site details, and regular maintenance/cleaning/disinfection are allowed, they will comply with current best practice and legal requirements.

Independent audits of the systems will be undertaken.

Schools will ensure that equipment is regularly serviced including inspection, cleaning and disinfection, and maintained to the standard required to control *Legionella* bacteria within the University. Records of servicing and maintenance will be kept and maintained.

8.3 Design, Installation and Maintenance

The Director of Estates and Facilities Management will ensure that appropriate design, installation and maintenance standards are applied to all University water systems.

8.4 Hot and Cold Water Systems

It is essential that the systems are kept clean and storage and distribution temperatures are acceptable

Estates and Facilities Management will ensure that distribution and storage systems comprising part of the building services infrastructure are inspected and cleaned as appropriate and are routinely checked for temperature and water demand.

The storage and circulation temperature of relevant systems, where possible, be outside the temperature range that promotes growth of *Legionella*.

8.4.1 Temperature Control – Hot Water Systems

The temperature of the water as it leaves the hot water heater or storage vessel should be at least 60°C, although if it is greater that this the risk of scalding increases.

Hot water shall be distributed such that it reaches all outlets at a temperature not lower than 50°C after the tap has been at full flow for one minute

Where this temperature can pose a scalding risk to such groups as young children, elderly and handicapped, or those with sensory loss, thermostatic mixing valves should be fitted. These must be placed within 2 metres of the outlets. In any case, where the outlet temperature exceeds 60°C, tap outlets must be marked with “hot water” warning signs.

8.4.2 Temperature Control – Cold Water Systems

Cold water storage shall be sited in a cool place and protected from extremes of temperature by thermal insulation, and monitored and maintained at less than 20°C. The volume of stored cold water should be minimised and it should not normally be more than one day's water use. Stagnation should be avoided where multiple tanks are in place.

Cold water storage pipes should be insulated to prevent excessive temperature rises in the cold water supply, typically not more than 2°C increase should be allowed.

Distribution of cold water shall be so that it reaches all outlets at a temperature not greater than 20°C after the tap has been operated at full flow for 2 minutes.

8.4.3 Review of Systems

Showers or taps used infrequently should be considered for removal and redundant supply pipe-work will be cut back as far as possible – ideally to the re-circulating loop.

Outlets that are required but not in regular use must be flushed weekly for several minutes to reduce the potential for growth. This should continue and be logged until the system is in full use again.

Where it is difficult to flush weekly, the stagnant and potentially contaminated water from the tap/shower and associated dead-leg needs to be purged before the appliance is used – important to do so with minimal aerosol production (eg remove shower head/pipe attachment from tap and run through before re-attaching)

Calorifiers, cisterns and tanks taken out of service should be emptied. Specified disinfection procedures must be followed before they are brought back in to use.

If a calorifier, or any substantial part of a hot water system, is on standby use or has been taken out of service for longer than one week, the water in the vessel should be raised to 60°C for 1 hour before being used. The temperature must be checked throughout the system with all pumps running. Any standby pumps must be run at least once per week.

8.4.4 Infrequently Used Outlets

Water outlets, including showers and WCs, that are unused for a week or more must be flushed through on a weekly basis and this activity recorded.

9. TRAINING/COMPETENCY and DEVELOPMENT

The University Responsible Person (*Legionella*) will receive such training as necessary to ensure and maintain the required level of competence.

Other staff, including technicians, maintenance staff and engineers, will be trained to ensure they have the required level of knowledge and understanding relevant to their work activities – training will be organised by the University Responsible Person (*Legionella*), and the Director of Safety.

10. RECORD KEEPING

The University Responsible Person (*Legionella*) will ensure that an appropriate record-keeping system for all water systems is in place, and is maintained.

Training records of key staff (see 9 above) will be maintained and retained.

11. AUDITING

The Responsible Person (*Legionella*) will ensure arrangements are in place for periodic Audit against this Management Procedure, and the Health and Safety Executive 'Approved Code of Practice L8'. A written report of findings of the audit will be presented to the University's Health, Safety and Environment Committee.

The University Health and Safety Office will undertake independent audits and monitoring of the Management Procedures, and will report observations, non-compliance and corrective actions as necessary to relevant Heads of Schools, Director of Estates and Facilities Management, and the Health, Safety and Environment Committee.

12. EMERGENCY PROCEDURES IN THE EVENT OF A CASE OF LEGIONELLOSIS AT THE UNIVERSITY

Emergency Procedures

Cases of Legionnaire's Disease confirmed in members of the University community, or in persons having spent time at the University, should be responded to in a proportionate manner, and should take account of any information provided by the Health Authorities, which they may have gained from their interviews with the patient.

The Health Protection Agency (HPA) will investigate any confirmed cases of Legionellosis which they believe may be associated with the University. In the event of an HPA investigation, the Responsible Person (*Legionella*), and the Director of Health and Safety must be informed immediately and they will co-ordinate the University's response.

It should be noted that members of the University may contract Legionnaire's Disease from a variety of sources, and the HPA will advise on whether they believe the University could have been a source, and follow-up actions should take account of this.

In the event that the HPA is of the view that the case has a possible link to the University, the first response is to establish the location(s) where the person works or may have visited and been exposed to water droplets. In any event, a review of the findings of the most recent temperature or systems checks should be done, together with any findings of risk assessments to confirm that any identified actions have been completed.

The Responsible Person (*Legionella*) and Director of Health and Safety may authorise or require the shut-down of any processes that are capable of generating and disseminating airborne water droplets, until sampling procedures and any remedial cleaning or other works have been done. The Enforcing Authority (Health and Safety Executive in the case of Universities) may insist on giving final clearance to restart the system.

The Responsible Person (*Legionella*) will authorise or require samples to be taken from systems before any emergency disinfection is carried out. This is to aid any investigation into the causes/source of the outbreak. The investigating officers from the relevant agencies may take samples or require them to be taken.

Confirmed infections that are attributable to the University's systems must be reported to the Health and Safety Executive under the Reporting of Incidents, Diseases and Dangerous Occurrences Regulations (RIDDOR). Such notifications will be made by the University Health and Safety Office.

If an 'outbreak' (by definition of the HPA where 2 or more cases occur in the same area) of Legionnaire's Disease occurs within the University, or associated with its activities, it is

essential that the University Health and Safety Office and the Head of Maintenance (Estates and Facilities Management) are contacted *immediately*.

Further temperature checks should be made on the hot and cold water systems as this serves to establish the operation of the system and to provide reassurance to those who may express concern over any reported cases.

Any enquiries or concerns expressed by members of the University community can be referred to the University Health and Safety Office.

Further Information

1. Legionnaire's Disease – The Control of *Legionella* in water systems. Approved Code of Practice and Guidance L8 (second edition)

www.hse.gov.uk/pubns/books/l8.htm - free to download

- Part 1 contains advice on your duties under the law
- Part 2 contains guidance on the technical aspects of the assessment and control of *Legionella* risks

2. Legionnaire's Disease: A guide for employers – leaflet IAC27 (rev2)

www.hse.gov.uk/pubns/iacl27.pdf

3. Legionnaire's Disease : A Guide for Providers of Residential Accommodation – Leaflet INDG376 (05/03) C1000

www.hse.gov.uk/pubns/indg376.pdf

APPENDIX 1 – MONITORING TASKS and FREQUENCIES

Frequency	Check	Standard to meet		Notes
		Cold Water	Hot Water	
Monthly	Sentinal Taps*	The water temperature should be below 20°C after running the water for up to two minutes	The water temperature should be at least 50°C within a minute of running the water	This check makes sure that that the supply and return temperatures on each loop are unchanged, ie the loop is functioning as required
	If fitted, input to Thermostatic Mixing Valves (TMVs) on a sentinel basis		The water supply to the TMV temperature should be at least 50°C within a minute of running the water	One way of measuring this is to use a surface temperature probe
	Water leaving and returning to calorifier		Outgoing water should be at least 60°C, return at least 50°C	If fitted, the thermometer pocket at the top of the calorifier and on the return leg are useful points for accurate temperature measurement. If installed, these measurements could be carried out and logged by a building management system
Six Monthly	Incoming cold water inlet (at least once in the winter and once in summer)	The water should preferably be below 20°C at all times		The most convenient place to measure is usually at the ball valve outlet to the cold water storage tank
Annually	Representative number of taps on a rotational basis	The water temperature should be below 20°C after running the water for two minutes	The water temperature should be at least 50°C within a minute of running the water	This check makes sure that the whole system is reaching satisfactory temperatures for <i>Legionella</i> control

*Sentinal Taps : For a hot water services - the first and last taps on a recirculating system. For cold water systems (or non-recirculating hot water systems), the nearest and furthest taps from the storage tank. The choice of sentinel taps may also include other taps which are considered to represent a particular risk.

Appendix 2 - Inspection Frequencies for Risk Systems
(extracted from ACoP L8 – as appropriate)

1. Hot and Cold Water Systems

Service	Task	Frequency	Duty Holder
Hot water Services	Arrange for samples to be taken from hot water calorifiers, in order to note condition of drain water	Annually	EFM
	Check temperatures in flow and return at calorifiers	Monthly	EFM
	Check water temperature up to one minute to see if it has reached 50°C in the sentinel taps	Monthly	EFM
	Visual check on internal surfaces of calorifiers for scale and sludge. Check representative taps for temperature as above on a rotational basis	Annually	EFM
Cold water services	Check tank water temperature remote from ball valve and mains temperature at ball valve. Note maximum temperatures recorded by fixed max/min thermometers where fitted	Six monthly	EFM
	Check that temperature is below 20°C after running the water for up to two minutes in the sentinel taps	Monthly	EFM
	Visually inspect cold water storage tanks and carry out remedial work where necessary. Check representative taps for temperature as above on a rotational basis	Annually	EFM
Shower Heads	Dismantle, clean and descale shower heads and hoses	Quarterly or as necessary	RSTS
Little-used outlets	Flush through and purge to drain, or purge to drain immediately before use, without release of aerosols	Weekly	EFM/RSTS

2. Other risk systems

System/ Service	Task	Frequency	Duty Holder
Spray humidifiers, air washers and wet scrubbers	Clean and disinfect spray humidifiers/air washers and make-up tanks including all wetted surfaces, descaling as necessary	Six Monthly	EFM
	Confirm the operation of non-chemical water treatment (if present)	Weekly	EFM
Water softeners	Clean and disinfect resin and brine tank - check with manufacturer what chemicals can be used to disinfect resin bed	As recommended by manufacturer	EFM
Emergency Showers and (mains) eye-wash sprays	Flush through and purge to drain, avoiding aerosol generation	As recommended by manufacturer	Schools
Sprinkler and hose reel systems	When witnessing tests of sprinkler blow-down and hose reels ensure that there is minimum risk of exposure to aerosols	As directed	EFM
Lathe and machine tool coolant systems	Clean and disinfect storage and distribution system	Six Monthly	EFM
Horticultural misting systems	Clean and disinfect distribution pipework, spray heads and make-up tanks including all wetted surfaces, descaling as necessary	Annually	Schools