

THE CONTROL OF LEGIONELLA BACTERIA IN WATER SYSTEMS



Author: Andy Lucas / Mark Evans

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Mark Evans		Mark Evans Assistant Director or Estates
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POLICY

1. POLICY STATEMENT

1.1 The Policy

The University has a statutory responsibility to ensure, so far as is reasonably practicable, the health, safety and welfare of all its employees whilst at work. This duty extends to ensuring that persons not employed by the University are, so far as is reasonably practicable, not exposed to risks to their health and safety.

This Safety Code of Practice (SCoP) sets out the policy and operational arrangements in place to reduce the risk of exposure to legionella bacteria so far as is reasonably practicable. This SCoP should be read in conjunction with the University Health and Safety Policy and supports the arrangements in place to comply with the Health and Safety at Work etc. Act 1974.

In considering the extent of the arrangements in place to address the potential risk from legionella, due regard has been given to the decided case R v Board of Trustees of the Science Museum 1993. As a result of this case, it is accepted that the duty owed by the university is to protect persons from the risk of, as well as the actual exposure to legionella. **The measures set out in the operational arrangements aim to achieve this level of compliance.**

In broad terms, the University will manage the risks by:-

- Identifying and assessing sources of risk and implementing and managing control measures
- Appointing a competent Responsible Person with authority to take day-to-day responsibility for managing and implementing this SCoP and operational arrangements
- Appointing a competent contractor to carry out a full site survey, identify risks and maintain the water services on campus
- Prepare a written scheme for preventing or controlling the risk – the Legionella Management Plan
- Monitoring and reviewing these arrangements to ensure they remain effective
- Ensuring all those involved in the application of this SCoP are competent
- Keep and maintain up to date records of the precautions implemented and do so for each of the premises within the University's control

2. BACKGROUND

2.1 Legionnaires' Disease

Legionnaires' disease can occur from exposure to legionella bacteria, usually in airborne water droplets, mists or vapours, generated from systems such as cooling towers, evaporative condensers, hot and cold water services and spa pools. The propagation of Legionella bacteria is enhanced by the following conditions:

- Where water temperature in a system falls between 20°C and 45 °C (the active temperature range of the bacteria)
- Systems in which water is re-circulated or stored

- Situations where bacteria growth is supported by the presence of biofilms and other organic material, scale, rust or sludge which provide nutrients to the bacteria
- Water services, in particular hot water service installations, humidifiers, cooling towers and air supply systems are the sensitive areas requiring close scrutiny regarding maintenance methods and procedures
- In new, occupied or partially occupied buildings, special care must also be taken as the circumstances may require bespoke solutions for circumstances encountered therein. In particular, buildings or parts of buildings that have not been occupied for a period of time will require particular attention

In some instances Legionnaires' disease can be fatal and therefore the preventative measures that the University of Worcester has implemented seeks to proactively address the risk to students, staff, visitors, contractors and the wider public and in general, the control measures will:

- Maintain an up-to-date assessment of the risk of exposure to legionella
- Keep water temperatures below 20°C and above 45°C
- Prevent the build-up of stagnant water by design and practice
- Regularly monitor water quality and take appropriate action where necessary
- Maintain a centrally located database for all documentation created to support this SCoP.

2.2 Further Information

Further Information about Legionella can be found in Appendix 1.

3. LEGISLATION AND GUIDANCE

3.1 Legal Background

Unlike other areas of health and safety including asbestos or noise etc. managing the risk of Legionella does not come under any specific legislation. However, the University maintains general duties under the Health and Safety at Work etc. Act 1974 (HSWA) and regulations made thereunder. A full list of relevant legislation and guidance can be found in Appendix 2. In addition to the HSWA, the main consideration with regard to compliance is the Control of Substances Hazardous to Health Regulations 2002.

The University is required by law, to produce, maintain, implement and review arrangements that are necessary, so far as is reasonably practicable, to manage the risk of exposure to legionella. This SCoP and operational arrangements, together with the general principles set out in the University Health and Safety Policy, aim to meet these legal duties.

Organisational Arrangements and Responsibilities

4. MANAGEMENT ARRANGEMENTS

4.1 Dutyholder

The HSE ACOP L8 'Legionnaires' disease: The control of legionella bacteria in water systems' sets out how the risk from legionella should be managed. In doing so, it identifies the role of the 'dutyholder' as being:

- the employer, where the risk from their undertaking is to their employees or others; or
- a self-employed person, where there is a risk from their undertaking to themselves or others; or
- the person who is in control of premises or systems in connection with work, where there is a risk from systems in the building, e.g. where a building is let to tenants, but the landlord keeps responsibility for its maintenance

The Dutyholder needs to ensure that the person carrying out the risk assessment and provides advice on prevention and control of exposure must be competent to do so.

The Vice-Chancellor and Chief Executive is appointed as **Dutyholder**. The Vice-Chancellor will take overall responsibility to ensure that the Control of Legionella Bacteria in Water Systems SCoP is implemented and that appropriate funding is made available to carry out any capital and revenue works. In practice, the Vice-Chancellor delegates the day-to-day implementation of the SCoP and to this effect will appoint a **Responsible Person** (Legionella) and **Deputy Responsible Person** (Legionella).

4.2 Responsible Person

The Dutyholder will appoint a competent person, known as the 'Responsible Person' who will have sufficient authority, competence and knowledge of the University estates and facilities to ensure that all operational procedures are carried out effectively and in a timely way. In essence, the **Responsible Person** will have day-to-day responsibility for managing the risk from exposure to legionella and implementing this SCoP. The **Dutyholder** will also appoint a **Deputy Responsible Person** in writing. Please refer to Appendix 3 Management Arrangements and Appendix 4 Practical Legionella Management.

The Head of Maintenance will be appointed as the **Responsible Person (Legionella)**. The Contracts and the Compliance Co-ordinator will be appointed as the **Deputy Responsible Person (Legionella)**. The Head of Maintenance will have primary responsibility for implementing the SCoP assisted by the Contracts and the Compliance Co-ordinator who will take on the role of the **Responsible Person** in their absence. It is recognised that the **Responsible Person** cannot be an expert on all matters and must be supported by specialists in specific subjects such as water treatment, design principles and requirements of water systems and microbiology, however they will maintain responsibility for calling upon and coordinating the activities of such specialists. In general, the role of the **Responsible Person** will be to have day-to-day responsibility for controlling the risk from legionella bacteria and these duties are set out in more detail in Appendix 5. The Responsible Person should possess adequate professional knowledge and be provided with appropriate training, updated on a regular basis.

4.3 Head of Safety

The Head of Safety will provide support to the **Dutyholder** and **Responsible Person** and this will include:

- Ensuring all relevant and current legislation, standards, guidance and ACOPs are incorporated into the SCoP
- Providing day-to-day support to the **Responsible Person** to assist with all aspects concerning health and safety, to include compliance with the SCoP and discharging the University's duties under the Health and Safety at Work etc. Act 1974 and regulations made thereunder
- Undertake a formal audit of the operational procedures to ensure compliance with the SCoP (at least once per year) and prepare a report with recommendations for the **Duty Holder** and **Responsible Person** using an audit proforma (Appendix 6)
- On an adhoc basis, conduct internal audits on specific aspects of the SCoP and report back to the **Responsible Person** with recommendations
- Take the lead during any formal investigation concerning any outbreak or suspected outbreak. Liaising with partners including the HSE, Public Health England and the Local Authority etc.

4.4 Assistant Director - Estates

The Assistant Director - Estates will have an overview of operational arrangements and support the Responsible Person by monitoring the Legionella Management Plan. Main responsibilities include:

- Review Audit and operational action plans on a regular basis and support any necessary improvements
- Report status of compliance to various committees – Leadership Team/ Health & Safety Committee

4.5 Appointed Contractor (Legionella)

CURRENTLY Integrated Water Solutions Ltd will be responsible for the following:

- Conducting a site survey of the University facilities and assets and identify any aspects presenting a potential or actual risk of exposure to legionella
- Provide schematic drawings with observations including photographs
- Advise on the required controls and procedures for the prevention or control of legionella risk
- Implement a system of periodic monitoring and review to be agreed by the Responsible Person
- Prepare and maintain up-to-date records for all work carried out

4.6 Nominated Persons (Legionella)

Head of Hospitality / Sports Facilities and Arena Managers / Cleaning Services Manager / Chief Technician

- Where necessary, provide students with relevant health and safety information as outlined in para 6.7
- Maintain an up-to-date list of all rooms which remain unoccupied for 7 days or more and ensure that the water systems in them are flushed weekly or in accordance with the Legionella Management Plan and ensure this is recorded
- Ensure that all shower heads and hoses are dismantled, cleaned and de-scaled in accordance with the Legionella Management Plan.
- A Nominated Person should possess adequate professional knowledge and be provided with appropriate training, updated on a regular basis

- 4.7 Directly Employed Skilled (Trades) Staff (Including University and Agency Maintenance Staff)
- All staff engaged in the operation and maintenance of water plant and systems do so in accordance with the SCoP for the minimisation of legionella risk and relevant codes of practice at all times
 - Comply with the standards and procedures laid down in the SCoP for the minimisation of legionella risk
 - Ensure that agency staff carry adequate public liability insurance cover as necessary

- 4.8 Contractors
- All contractors employed by the Estates and Facilities department are responsible for ensuring that they and any sub-contractor reporting to them, carry out their activities in a way that complies with the SCoP
 - The above includes verbal instructions as considered appropriate by the University Officer to whom they are accountable
 - The Estates and Facilities department will work with the Finance Department (Procurement) to ensure adequate insurance liability cover is provided by the Contractor

- 4.9 Project Managers and Design Consultants
- Project Managers and any consultants appointed by them shall be responsible for the effective design and management of all capital and refurbishment schemes including appropriate and comprehensive commissioning which is to be agreed with the **Responsible Person** (Legionella) during the design stage. To comply with CDM Regulations, information about an existing system that is to be modified should be passed to the Project Manager, together with the operating criteria that have to be achieved for the system. This should detail installation and commissioning requirements. They will also be responsible for ensuring that plant and services are capable of meeting any increased demand where a system is extended and for the provision of as-fitted drawings at the time of handover, together with all commissioning data. No system will be accepted unless the **Responsible Person** (Legionella) is agreeable.

Operational Arrangements

5. PRACTICAL CONTROL

5.1 Conditions to Support Legionella

Water temperatures between 20°C and 45°C promote growth of legionellae. The optimum temperature for growth is 37°C. Therefore, water supplies should be kept out of this range wherever practicable. Organisms may remain dormant in cool water and multiply only when the temperature reaches a suitable level.

Sediment, sludge, scale and organic materials are a principle nutrient source for legionella. Iron oxide will also promote and assist the growth of legionella in storage tanks and service pipework. Therefore, there is a requirement for regular cleaning of such services.

The use of some rubbers, leathers, jointing compound, mastics, wooden packing and certain plastics should be avoided as they can provide a nutrient source for legionella.

Organisms in water such as algae, amoebae and other bacteria, may serve as an additional nutrient source for Legionella. Thus, a regular disinfection and cleaning programme and procedure is essential.

The formation of biofilms within a water system also provides a nutrient source and a safe harbour for Legionella. A biofilm is primarily a layer of micro-organisms combining a matrix, which form a surface slime when in contact with water.

Exposure of water to sunlight may stimulate the growth of algae and the formation of slimes. In addition, stagnant water encourages colonisation by legionella.

High Risk Areas:

- Air-conditioning systems, humidifiers and chiller battery installations
- Hot water services and storage tanks
- Water systems incorporating an evaporative condenser
- Any systems containing water likely to exceed 20°C and which may release a spray or aerosol during operation or when being maintained

High Risk Persons:

- a) Heavy drinkers
- b) Smokers
- c) Persons aged over 45 years
- d) Those with impaired immune systems
- e) Those suffering from or being treated for:
 - i. Respiratory illness
 - ii. AIDS/HIV
 - iii. Head/neck cancer
 - iv. Bone marrow
 - v. Renal dialysis
 - vi. Leukaemia
 - vii. Organ transplant

5.2 Methods of Prevention

- a) Remove all taps and outlets and associated pipework which are not used or are under-used.

- b) Where low-use outlets have to be retained ensure they are flushed on a weekly basis, records of flushing shall be retained in a format agreed by the Responsible Person. Flushing shall be carried out in accordance with procedures set out in Appendix 7.
- c) Ensure that the hot water temperatures for calorifiers and hot water storage vessels are maintained at a temperature at or above 60°C and this temperature does not fall below 50°C at any point within the circulation pipe work.
- d) Ensure that all pipe work carrying blended water at temperatures of between 25°C and 43°C minimum is as short as is practically possible.
- e) Reduce the length of dead-legs or spurs from the main hot water circulatory system to a minimum.
- f) Avoid stagnation of water in storage vessels and within pipe work.
- g) Maintain stringent cleanliness of water systems and ventilation systems.
- h) Use the most appropriate water treatment regime in wet cooling towers.
- i) Introduce a suitable level of maintenance to ensure correct and safe operation of water systems and compliance with statutory regulations.
- j) Minimise the amount of water stored (24 hours maximum) under normal use conditions.
- k) Keep all water storage systems clean and sealed from entry of extraneous matter and maintain temperatures below 20°C for cold-water services.
- l) Introduce a system of continuous dosing of the incoming cold water services using a recognised chemical solution or other approved means which will assist in reducing the risk from Legionella and other water-borne micro-organisms and which may also allow domestic hot water temperatures to be reduced, thereby considerably reducing the risk of scalding.

6. RISK ASSESSMENT

6.1 Risk Assessments

Legionnaires' disease is most commonly caused by the inhalation of contaminated water droplets or aerosols. It is therefore necessary to identify the sources of possible infection where respirable water sprays or aerosols are created. Legionnaires' disease. The control of legionella bacteria in water systems HSE Approved Code of Practice (ACOP) L8 requires that all systems susceptible to colonisation by legionella and which may create water droplets/aerosols must be identified and then risk-assessed.

6.2 Risk Assessment Procedures

The ACOP L8 clearly states the requirement for employers and others to undertake assessments to establish the risk of exposure to legionella. In pursuance of this Policy, the responsibility to carry this out rests with the **Responsible Person** (Legionella), supported by the **Deputy Responsible Person** (Legionella) working with the Appointed Contractor (Legionella). A number of factors are required to create a risk of acquiring legionellosis, namely:

- The presence of legionella bacteria
- Conditions suitable for the organism to grow and multiply in water storage and distribution systems, i.e. at temperatures between 20°C – 45°C and with a source of nutrients e.g. sludge, scale, rust or algae.
- A means of creating and disseminating breathable water droplets or aerosols such as from a shower.
- The presence of people who may be exposed to infection, particularly vulnerable persons such as patients in healthcare premises, organ donors, asthmatics, et al.

If at least one of these risk factors is absent, then Legionnaires' disease is less likely to occur. If all factors are present then the objective must be to eliminate one or more of them. In practice, the

risk can be dealt with by identifying potential sources of water droplet/aerosol dissemination and preventing conditions that may allow the proliferation of Legionella bacteria.

Whilst there may be common risk factors associated with premises in the University, the individual nature of each premises should be considered. The **Responsible Person** (Legionella) will engage the Appointed Contractor (Legionella) to conduct a site survey of the water system. This should be undertaken for each premises to include a list of all associated plant and equipment, such as calorifiers, boilers, pumps etc. Either 'as-fitted' drawings or a schematic diagram showing the configuration of services is also required, as is a description of the water system indicating the normal operating parameters, including maintenance schedules and actions to be taken if and when abnormal situations occur.

Where there is a legionellosis risk identified, the significant findings should be recorded and where necessary, included in the Legionella Management Plan. Actions to control the risk should be vigorously monitored to ensure effectiveness and assessments reviewed at least every two years or more frequently if changes to the system are made or risks change. A detailed list of considerations is contained in Parts 1, 2 and 3 of the ACOP L8.

In carrying out the survey, the Appointed Contractor (Legionella) will consider:

- Layout and arrangement of all calorifiers and pumps.
- Layout and arrangement of all pipework, cisterns, humidifiers, cooling towers and evaporative condensers.
- All other water systems, such as hydrotherapy pools, which may present a legionellosis risk.
- Dead-legs and blind ends, with lengths and diameters indicated where available
- The water temperatures of all water systems, calorifiers, humidifiers, and evaporative condensers and all other strategic points.

The Appointed Contractor in consultation will consider the risk and develop a scheme for risk control in order of priority and present the report for the attention of the Responsible Person (Legionella) and Head of Safety.

The **Responsible Person** (Legionella) will then Carry out a physical inspection of the various water systems, from the entry sources onto the University's property to the various water outlets and produce a Legionella Management Plan outlining the remedial actions to be taken and any further action necessary to achieve the aims set out in the SCoP. The Plan will be discussed at the monthly Legionella Compliance Group meeting (see Appendix 8)

The assessment should be reviewed annually or sooner if it is thought that the original assessment may no longer be valid. Such circumstances would typically include:

- changes to plant or water systems or their use
- changes to the use of the building in which the water system is installed
- the availability of new/revised information relating to risk control measures.
- the results of checks which indicate that control measures are no longer effective. These may be elevated TVCs (total viable counts) or a positive sample analysis result when tested specifically for the presence of Legionellae.

6.3 Sources of Contamination

The following sources are those most likely to promote conditions where Legionellae will thrive and which may lead to the generation of airborne water droplets/aerosols that could be inhaled. These are considered to be the main high-risk sources that are susceptible to colonisation by Legionellae. It is therefore important to ensure that all operation and maintenance instructions contained within this

document are adhered to. It will be the responsibility of delegated personnel, be they University of Worcester employees or Agents, to implement the necessary procedures for the control of Legionellae within University buildings.

ALL SPRAY AND AEROSOL-PRODUCING WATER PLANT, WHETHER LISTED BELOW OR NOT, SHOULD BE IDENTIFIED, RISK-ASSESSED AND THE ASSESSMENT RECORDED.

6.4 Cooling Towers including Evaporative Condensers

There are no cooling towers at the University.

6.5 Air-Conditioning Plant and Ductwork

Within an air-handling unit, water pools can form where accumulations of water droplets are arrested on filter elements. This water is susceptible to contamination by particles collected alongside on the filter element.

Condensate drip trays under cooling coils are specifically designed to collect the condensing moisture formed on the coil face, and this standing water can be contaminated directly by airborne particles, or *via* the drainage system if inadequate precautions have been taken to ensure that an air-break is included within the discharge pipes.

Within an air-conditioning system, accumulations of water occur at various points throughout the distribution ductwork, depending on weather conditions and the demands of the control system.

6.6 Hot and Cold Water Systems

The potential risk within hot and cold water systems can be increased by a number of factors including: excess water storage capacities; periods when accommodation is unoccupied for periods in excess of 7 days; inadequate sealing of water tanks (*e.g.* lack of lids or ill-fitting lids); unscreened overflow pipes and inadequate or unsuitable thermal insulation. Lack of circulation and flow in water tanks created by unsuitable or incorrect positioning of water inlet and discharge connections resulting in stagnation should also be considered.

Temperature stratification, stagnation and sediment build-up can occur in domestic hot water calorifiers and heaters.

Hot water systems should supply water to all outlets at a temperature of at least 50°C. In some cases this may prove difficult to achieve because of inadequate insulation or poor circulation. In such cases, careful risk assessment of these circuits and outlets must be made to determine appropriate corrective action.

Pipework dead-legs have often contributed to the proliferation of Legionellae in that they can contain sediment, sludge and scale and, in some instances where the outlet being served is infrequently used, can operate at water temperatures within the critical Legionella growth range. Positioning of drain cocks on distribution pipework should be given due consideration to prevent the creation of avoidable dead-legs.

6.7 Student Accommodation

Although student accommodation will be included in the operational arrangements of this policy, there will be times when additional measures are needed. Students will be provided with information regarding legionella risks etc. at the start of their tenancy agreement. Information will include any measures necessary arising from the findings of the risk assessment. Students should

also be advised to inform the University/landlord if the hot water is not heating properly or if there are any other problems with the system. Other measures are set out in Appendix 7

6.8 Showers and Spray Heads

Showers are a potential site of contamination by Legionellae bacteria. The risk potential increases with reduction in use and the lack of a facility to dump blended water between operations. Water retained within the shower unit can remain within the ideal legionella proliferation range until the next user operates the shower, thereby creating an aerosol spray from water which may have remained stagnant.

Further consideration within the category of showers should be given to the equipment utilised in kitchens to pre-wash dirty dishes. This type of spray unit is invariably complete with a hand-operated control valve linked by flexible or solid connections to the hot and cold water supplies whose valves are left at pre-set positions to achieve the desired temperature blend. This may provide an ideal temperature for growth of the bacteria when not in use, but can also cause cross-contamination between hot and cold systems as a result of pressure fluctuations.

Also within this category are spray taps attached to washbasins within toilet facilities. These taps may create water sprays/aerosols.

6.9 Spas and whirlpool Baths

Spas and whirlpool baths, which can create a spray or aerosol, have been linked with various infections including Legionnaires' Disease.

6.10 Project Works

Upon completion of a building refurbishment project or new build, instruction will be given to an LCA-registered sub-contractor to undertake a full building clean and chlorination of the domestic water services.

Microbiological sampling should be undertaken once the system has been fully neutralised to ensure all residual bacteria, including Legionella, have been eradicated. Following completion of this, the building will then be available for hand over to the responsible person in the Estates and Facilities Department .

A copy of the clean and chlorination certificate will be provided by the sub-contractor and placed within the log book provided.

It is a requirement that all new buildings and installations therein shall adopt the design practices laid down in BS 8558:2015 and conform to the Water Regulations Advisory Scheme – Water Regulations Guide. All materials utilised in future installations, be they new or used to modify existing systems, will be materials which are approved by the Water Research Centre and identified in their Water Fittings and Materials Directory.

All contractors engaged by the University, or one of its subsidiaries, working on the water system are required to confirm how they will comply with this Policy.

6.11 Water Treatment Requirements

To ensure that installations utilising water within University of Worcester buildings are maintained to the requisite standards, a regime of water treatment will be adopted as required. This regime must comply with the ACOP L8 and the Control Substances Hazardous to Health Regulations 2002 (COSHH).

7. LEGIONELLA MANAGEMENT PLAN

7.1 Outline

Where the Risk Assessment indicates that there is a foreseeable risk, use of such equipment or systems leading to exposure to legionella bacteria should be avoided as far as is reasonably practicable. Where this is not reasonably practicable, suitable management and monitoring precautions must be implemented and recorded. This will require a written Legionella Management Plan for minimising the risk of exposure to be prepared by the **Responsible Person** (Legionella). It is vital that the plan should be suitably detailed to enable it to be implemented and managed effectively.

7.2 Preparation of an Legionella Management Plan

On completion of the risk assessment survey, the **Responsible Person** (Legionella) will produce a Legionella Management Plan to address the risks identified in the survey. The Plan will consist of the following:

- Develop schemes for risk minimisation and control in order of priority, giving consideration to cost, risk and resources
- List all areas in priority order of non-compliance and potential risk
- Devise a management programme for the minimisation of risks so that an action plan identifying resources and timescales can be drawn up to include areas where there will be reduced use of water at certain times of the year
- The **Responsible Person** (Legionella), shall apportion funding in conjunction with the budget holder, and advise the operational team of the works and planned remedial actions
- Review the programme of the action plan at yearly intervals and record progress in implementing the work. All changes to the water systems and functional content shall be recorded and evaluated

8. MAINTENANCE

8.1 Monitoring

Monitoring will be carried out in accordance with HSE ACOP L8, please refer to Appendix 9 Suggested Monitoring Regime and Timescales. This will be determined by the Responsible Person in consultation with the with the Appointed Contractor and Assistant Director – Estates.

8.2 Maintenance Procedures on Systems that are Susceptible to Colonisation by Legionellae

The following maintenance procedures will be adopted in University of Worcester buildings:

- A comprehensive risk assessment must be carried out to identify those installations at risk.
- It is a requirement that full records are kept of all maintenance procedures carried out, and that copies of the records are maintained in an accessible position on site, for routine inspection by visiting surveyors and statutory officers.
- To ensure that the above procedures are carried out effectively, it will be necessary for up-to-date record drawings of the various installations to be included with the operating manuals, complete with manufacturer's information.
- When implementing the maintenance procedures and when cleaning and decontamination work is carried out, it will be necessary for operatives to ensure that adequate safety precautions are taken and that suitable protective wear and equipment is utilised as required, to comply with the

Health and Safety at Work etc. Act 1974. The procedures laid down in the ACOP L8 must also be considered.

- All Facilities Management appointees and Maintenance Contractors employed by University of Worcester or their Agents will be required to submit a copy of their Safety Procedures before undertaking any activities at University of Worcester. Where work is taking place on water systems Risk Assessments and Method Statements should explain how they propose to mitigate any Legionella risk.

8.3 Maintenance and Care of Water Systems Equipment

All equipment used in the University that has water in the system, e.g. water coolers, dishwashers *etc.*, can affect the water supply or the atmosphere. Therefore it is important to seek advice from the **Responsible Person** (Legionella) before purchase. The equipment must be properly installed and maintained and must be monitored regularly in accordance with the following regime:

- The systems must be carefully designed so as to minimise aerosols and the material used in the construction shall not harbour or provide nutrient for bacteria. They must be designed to be readily drained and cleaned.
- The systems must be maintained in a clean and sound condition.
- The water quality must be maintained by the use of water treatment, cleaning and disinfection on a regular basis.
- Careful monitoring of the precautions.
- Records must be kept of the maintenance performed and the results obtained.

8.4 Suggested Protocol for Legionella Sampling

All the following assume that the systems being examined have had a full risk assessment carried out on them previously and have been maintained. It is noted that no control measures can guarantee the elimination of legionella from the water system.

8.5 Microbiological Monitoring of Hot and Cold Water Systems

Microbiological monitoring of the system should be conducted where there is doubt about the performance of the existing control regime and in any case in accordance with HSG 274 Part 2. The risk assessment should also set out where it might be appropriate and may include the following circumstances:

1. Where water systems are treated with biocides where water is stored or distribution temperatures are reduced.
2. To monitor the effectiveness of control measures (e.g. treatment with biocide) implemented in place of relying on the "temperature regime" (hot water circulated at 60°C and delivered at least 50°C within 1 minute of opening an outlet; cold below 20°C within 2 minutes of opening)
3. In systems where control levels of the treatment regime (e.g. temperature; biocide residuals) are not being achieved consistently
4. Where an outbreak of legionellosis is suspected or has been identified

In all other situations, risk management and monitoring should be based on carefully monitoring temperatures and regular maintenance in accordance with the ACOP L8 and HSG 274 Part 2: The control of legionella bacteria in hot and cold water systems (see Appendix 9 and 10).

9. TRAINING

9.1 Training Matrix

The Responsible Person will identify the training needs of all those engaged in delivering the Policy and will produce a training matrix. This will be reviewed as necessary by the Legionella Compliance

Group and the training matrix amended accordingly. The Training Matrix will form part of this SCoP once drafted and agreed.

10. OUTBREAK

10.1 Definition

An outbreak is defined as two or more cases where the onset of the illness is closely linked in time (weeks rather than months). In addition, there needs to be epidemiological evidence of a common source of infection and the responsibility to declare an outbreak rests with the Proper Officer (usually the Consultant in Communicable Diseases Control (CCDC)).

10.2 Outbreak Action

It is likely that once an outbreak has been declared by the authorities, an Outbreak Control Team will be convened and an investigation will be carried out. Guidance on the management of such investigations has been published by PHE 'Guidance on investigating cases, clusters and outbreaks of Legionnaires' disease. The investigation will aim to identify the likely source and implement measures to contain the outbreak and make safe. The other element of the investigation will be conducted by HSE and this will be a criminal investigation to identify cause and where there is fault, to consider legal action.

10.3 Single Case

Where a single case is identified, it is likely that there will also be an investigation although not to the extent of an outbreak.

10.4 University Plan of Action

Irrespective of whether an outbreak, single case or suspected case is confirmed, the University will follow the measures set out in the Plan of Action Appendix 11.

10.5 Actions to be taken in the case of a water supply giving a positive legionella test result

Following isolation of a potential source of exposure to legionella, action should be taken in accordance with the Action Plan to treat any contaminated water and pipework. The action is set out in Appendix 12

APPENDIX 1

Legionella

Legionella pneumophila is the bacterium causing Legionnaires' disease. This is identified as a pneumonia-type infection of the lower respiratory tract. The infection is most commonly acquired by the inhalation of air-borne droplets or particles containing viable legionellae.

Investigations have shown that the occurrence of Legionellae contamination is greater in hot and cold water services than in cooling towers. However, it should be remembered that the contamination "footprint" of a wet cooling tower is larger than any other likely source.

Legionellae ecology in water systems is not entirely understood. However, the following conditions have been documented as affecting its rate of growth:

The presence of sediment, sludge, scale and organic material can provide nutrients and protection for Legionellae. Legionellae have been shown to colonise certain types of material used in the construction of water systems, many of which also provide nutrients.

Other organisms commonly encountered in water systems such as bacteria, amoebae and algae can provide a suitable nutrient and habitat in which Legionellae can survive, multiply and concentrate.

Installations containing biofilms can harbour and provide favourable conditions for Legionella growth. Legionella, which can grow inside protozoa and within biofilms, may be protected from biocides that would otherwise kill or inhibit growth within the water system.

Legionella is most likely to proliferate in water systems which have a temperature between 20°C and 45°C. Human blood temperature of approximately 37°C is that at which the bacterium is most active. Water within the above temperature range and which is stagnant appears to provide the ideal conditions to promote colonisation by Legionellae.

Legionella will survive at temperatures below 20°C but is considered to be in a dormant state with no colonisation activity. The bacterium does not survive temperatures maintained consistently at 60°C or above.

APPENDIX 2

Law and Guidance

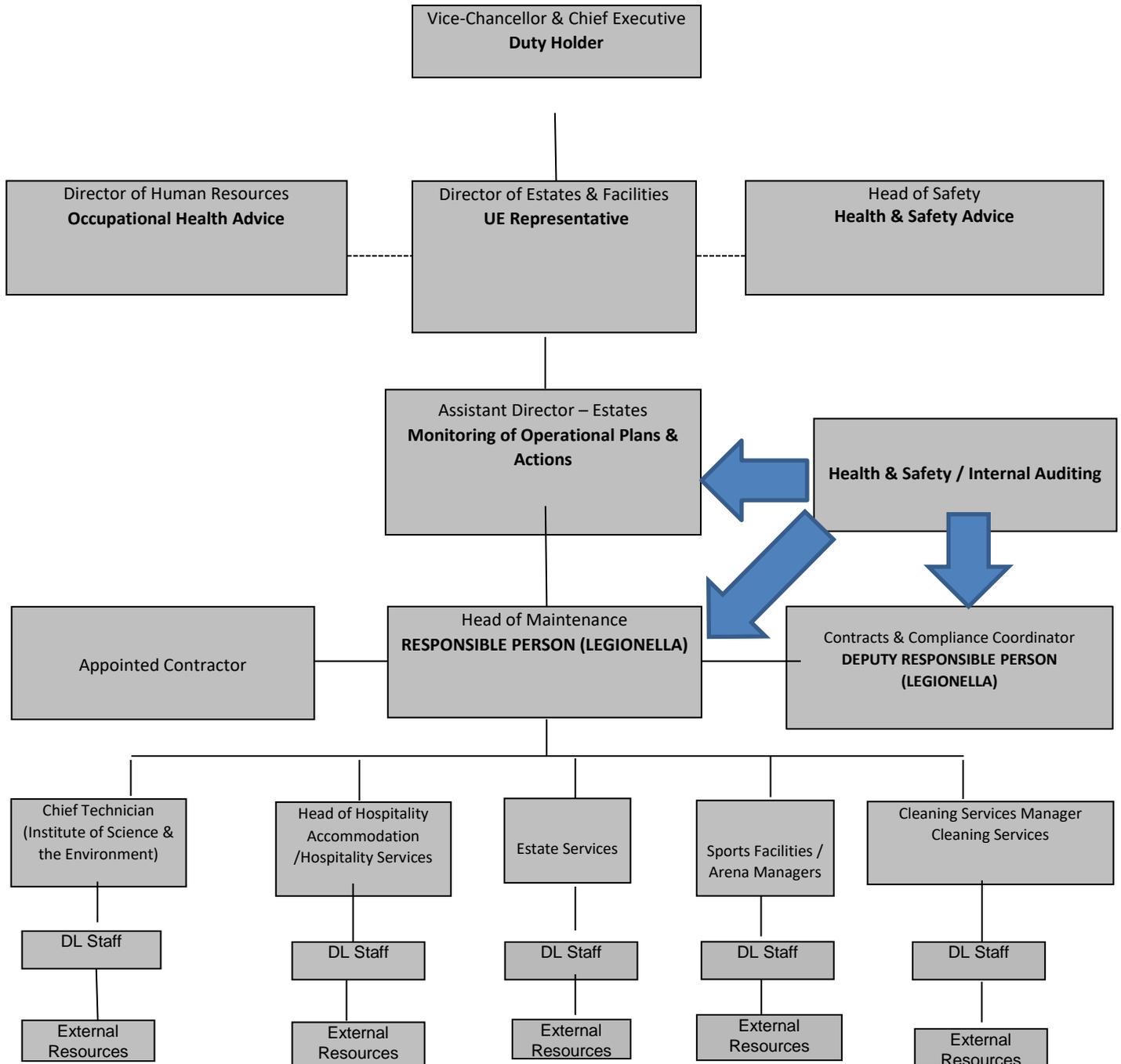
Legislation	Outline
Health and Safety at Work etc. Act 1974 (the Act)	Primary Legislation General duties that apply to employers, employees and the self employed. Managing and controlling the risks associated with legionella will be a duty relevant to the Act. A failure to do so may be deemed a contravention of the Act.
Management of Health and Safety at Work Regulations 1999	These Regulations provide a broad framework for effective management of health and safety at work. The regulations require the University to carry out risk assessment; ensure competence of staff; appoint competent persons to assist; set out arrangements to deal with serious incidents; cooperate with others who also work at the University; sets out the arrangements to effectively manage health and safety.
Control of Substances Hazardous to Health (COSHH) Regulations 2002 (as amended in 2005)	The Regulations provide a framework of actions designed to control the risks from a range of hazardous substances and biological agents including legionella.
The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013	Requirement for confirmed cases of legionnaire's disease to be notified to the enforcing authority, in this instance the HSE.
The Health Protection (Notification) Regulations 2010	Requirement for a registered medical practitioner to notify confirmed cases of Legionnaires' Disease to the 'proper officer' (this is in addition to any requirements under RIDDOR). In general, this will be a notification to Public Health England.
Cooling Towers and Evaporative Condensers Regulations 1992	Universities are required to register cooling towers and evaporative condensers with the local authority and are subject to their inspections and requirements.
Guidance	Outline
Legionnaires' disease. The control of legionella bacteria in water systems HSE Approved Code of Practice (ACOP) L8	The ACOP is aimed at dutyholders, including employers, those in control of premises and those with health and safety responsibilities for others, to help them comply with their legal duties in relation to legionella.
Control of substances hazardous to health The Control of Substances Hazardous to Health Regulations 2002 (as amended) Approved Code of Practice L5	It outlines the preferred or recommended methods that can be used to comply with COSHH and the accompanying guidance also provides advice on achieving compliance
Legionnaires' disease A brief guide for dutyholders HSE INDG 458	The leaflet is aimed at employers and people in control of premises, eg landlords, where man-made water systems are used that could be a potential source for legionella bacteria growth.
Legionnaires' disease Technical guidance HSE HSG 274 Parts 1-3	This guidance is supports L8 and gives practical guidance to include identifying and assessing sources of risk, preparing a scheme to prevent or control risk, implementing, managing and monitoring precautions, keeping records of precautions and appointing a manager responsible for others.
The control of legionella and other infectious agents in spa-pool systems HSE HSG 282	This guidance is primarily for those who manage or operate spa-pool systems and explains how to manage and control the risks from legionella and other infectious agents.

BS 8558:2015 Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages. Complementary guidance to BS EN 806	Standard replacing BS 6700:2006
Safe water in healthcare premises Dept of Health (HTM 04-01)	This health technical memorandum gives advice and guidance on the legal requirements, design applications, maintenance and operation of hot and cold water supply, storage and distribution systems in all types of healthcare premises. Principles can be applied to the University.
European technical guidelines for the prevention, control and investigation of infections caused by Legionella species	The guidelines provide technical guidance for those involved in the design, installation, commissioning, risk assessment and management of building water systems.
European Legionnaires' Disease Surveillance Network (ELDSNet)	https://ecdc.europa.eu/en/about-us/partnerships-and-networks/disease-and-laboratory-networks/eldsnet Various tools to assist in managing outbreaks of legionaries' disease.
Water fittings and materials directory Water Regulations Advisory Scheme www.wras.co.uk/Directory	Directory of approved water fittings
Guidance on investigating cases, clusters and outbreaks of Legionnaires' disease	Guidance on the investigation of Legionnaires Disease published by PHE

APPENDIX 3

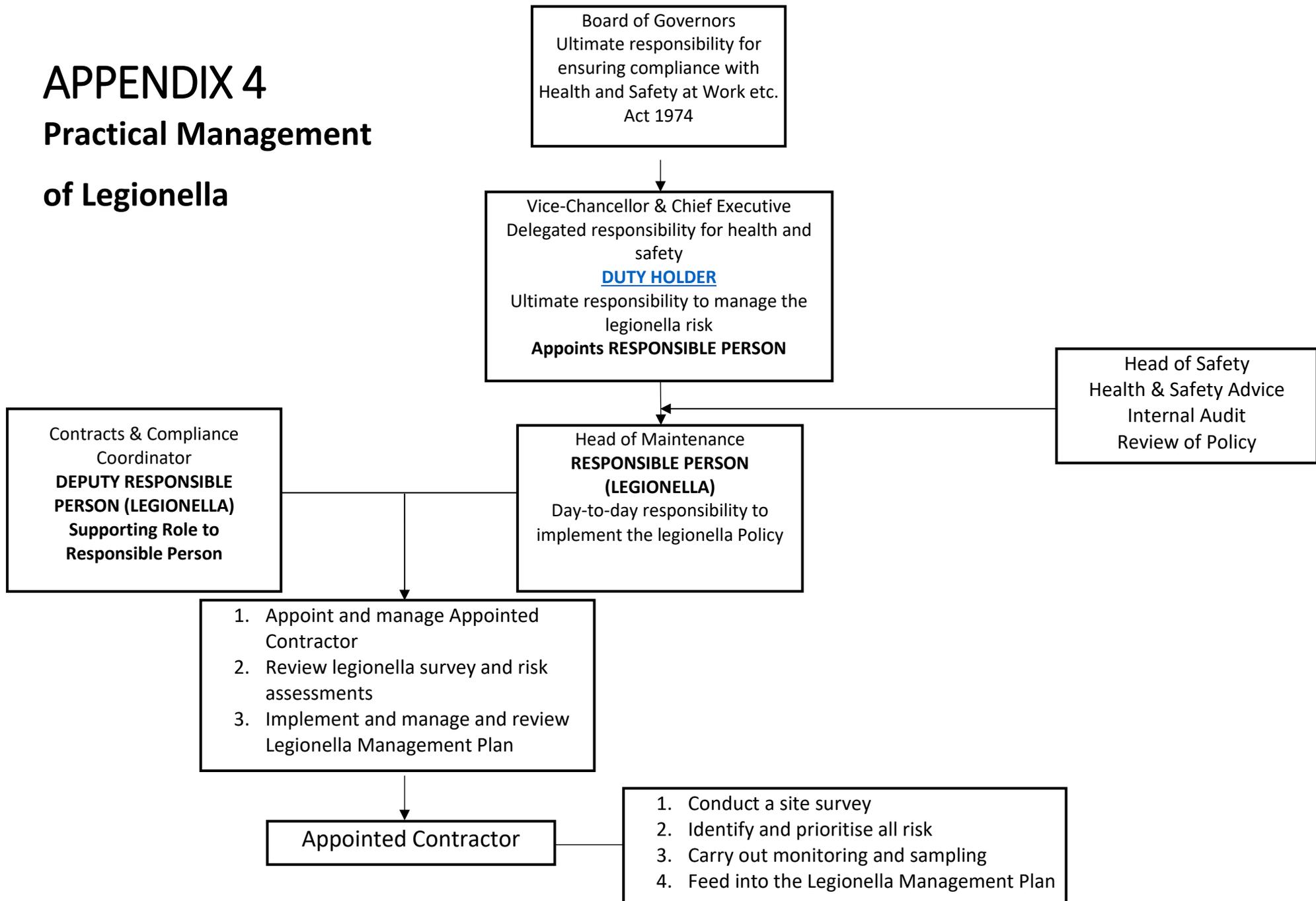
MANAGEMENT ARRANGEMENTS 2017/18

LEGIONELLA



APPENDIX 4

Practical Management of Legionella



APPENDIX 5

Role of the Responsible Person (Legionella)

The main duty of the **Responsible Person** is to implement the SCoP on a day-to-day basis. Although not an exhaustive list, this will include the following although some duties may be delegated to the **Deputy Responsible Person** as necessary:

- Produce, develop, implement, manage and review the SCoP and operational procedures as necessary.
- With reference to the HSE guidance L8 'Legionnaires' disease. The control of legionella bacteria in water systems', the **Responsible Person** will ensure there is in place a 'written scheme'.
- Select an **Appointed Contractor (Legionella)**.
- Ensure that up-to-date schematic drawings are available for all water systems.
- Ensure that suitable and sufficient risk assessments are carried out proactively and after any change or alteration to water systems, and that risk assessments are reviewed annually.
- Identify and request the necessary funding required to implement the precautionary measures and any improvement or alteration works necessary to implement the SCoP.
- Assist in a formal audit of the procedures to ensure compliance on a regular basis, at least annually.
- Nominate people with managerial control of tasks within areas of the site NOT covered by the Appointed Contractor (e.g. flushing low use outlets).
- Chair the Legionella Compliance Group meeting.
- Ensure that any action plans are reviewed and updated on a monthly basis and discussed at the Legionella Compliance Group meeting.
- Ensure effective communication to the Director of Estates & Facilities on all aspects of water safety including legionella.
- Ensure arrangements are in place to ensure effective communication to all staff involved in implementing the SCoP, thus effecting full execution of any written scheme of precautions necessary to minimise the risk of legionella proliferation in the areas under their control.
- Lead on legionella and water safety issues relating to all new & refurbishment projects.
- Ensure the appointment of suitable contractors for water related installations are appointed for all projects.
- Ensure a suitable and sufficient risk assessment is carried out for all new and refurbishment projects, and that any actions emerging from the audit are assessed and implemented.
- ensuring equipment that is to be permanently connected to the water supply is properly installed and maintained;
- Ensure adequate and consistent records are maintained throughout the University in accordance with the SCoP.
- Identify any training needs for staff as appropriate.
- Liaising with the water undertakers and environmental health departments and advising on the continuing procedures necessary to ensure acceptable water quality.

The **Responsible Person** shall ensure Managers prepare an operational plan in place for the area of the campus under their control. This document should comprise:

1. Up-to-date as-fitted drawings, schematic diagrams and descriptions of all the supply, storage and distribution systems within those premises

2. Step-by-step instructions to operate, maintain, control and shut down the water supply, storage and distribution systems within those premises
3. A schedule of possible emergency incidents causing loss of the water supply from the water undertaker. Each item in the emergency incident schedule should include guidance on operational procedures to re-establish a stable wholesome water supply

APPENDIX 6

Suggested Internal Audit Schedule – to be finalised with the Responsible Person

Activity	Evidence of Compliance	Evidence provided
External suppliers providing testing & consultancy services on the water Systems	<ol style="list-style-type: none"> 1. Sub-contractor competency records 2. Policies & procedures 3. Management Action Plan in place 4. Scheduled maintenance achievement reports 5. Instrument calibration records 	
Internal Training & Competence	<ol style="list-style-type: none"> 1. Internal Employee Training Records 2. Policy has been communicated and evidenced 	
Risk assessments	<ol style="list-style-type: none"> 1. Generic risk assessments 2. Completed specific risk assessments 	
Codes of practice and standards for work IN industrial and commercial sectors	Library of applicable standards <ul style="list-style-type: none"> • HSE Approved code of practice L8 • COSHH Regulations 2002 • Management of Health & Safety at Work Regulations 1999 • Health Technical Memorandum HTM04-01 (Where Applicable) 	
Emergency work	<ol style="list-style-type: none"> 1. Emergency response procedure to legionella high counts – evidence of the procedure working correctly 2. Emergency response procedure to legionella outbreaks – evidence of the procedure working correctly 	
Maintenance of Water Systems	<ol style="list-style-type: none"> 1. Water tank records & cleaning in place 2. Sub-contractor contracts in place & suitable 3. Policies & procedures adhered too 4. Scheduled maintenance reports evidenced 5. Operational Plan and areas of improvement are being actioned 6. Schematic Drawings and Isolation Points are identified and available 7. Records of flushing of low use outlets (weekly) 	
Records of Test Certification	Paper or data base Asset records available	
Compliance of Policy	<ol style="list-style-type: none"> 1. Relevant standards 2. Procurement policy 	
Essential equipment	Equipment and evidence of in-date calibration for portable equipment	

APPENDIX 7

Procedure for flushing low-use outlets

The water system in residences (and elsewhere at the University) is regularly cleaned, disinfected and monitored by the Legionella Contractor, and is operated at temperatures to provide conditions that prevent the growth of the bacteria that cause Legionnaires Disease. However, there is a possibility that the bacteria might start to grow in parts of the water system when not in regular use and is most likely to occur in pipes connected directly to showerheads or taps. As a general rule, outlets on hot and cold water systems should be used at least once a week to maintain a degree of water flow and minimise the chances of stagnation. During periods of non-occupancy/use (> 7days), a system to flush the water system will be implemented and form part of the Legionella Management Plan and will be identified as part of the risk assessment process.

Showerheads or taps should be flushed through on a weekly basis or as necessary based on an assessment of risk, this will ensure that any contamination that might occur is kept at a low level. The first 30 seconds to 1 minute flush is the period of greatest risk and staff should avoid contact with spray from outlets during this period.

Showers

Unless the risk assessment states otherwise, water must be run from both the hot and cold supplies, or warm if on a single mixer tap, through the showerhead for 5 minutes if the shower has not been in use for a period of 7 days. Showerheads are designed to produce spray so the shower head should be immersed in a bucket of water to avoid spray generation or, if a fixed head, run water at very low rate of flow (dribbling) through the head for 1 minute following which the rate can be increased for a further 4 minutes.

Taps

Unless the risk assessment states otherwise, water must be run from both the hot and cold supplies, or warm if on a single mixer tap, through tap(s) for 5 minutes, if the taps have not been in use for a period of 7 days. The water should be run slowly to avoid spray for 1 minute and can then run faster for a further 4 minutes.

Records should be kept detailing the time, date, location and name of the person who carried out the flushing procedure. The format of these records must be agreed by the Responsible Person.

Procedure for purging infrequently used outlets

Outlets that are difficult to flush weekly should be purged to drain before the outlet is used normally. The following procedure should be utilised:

1. Use additional piping to purge to drain if it is envisaged that spray may be produced.
2. Open the outlet slowly at first.
3. It is important that this is done with the minimum production of spray.
4. Run the outlet for 5 minutes before using the outlet.
5. Records should be kept detailing the time, date, location and name of the person who carried out the purging procedure.

It is envisaged that this procedure will only apply to outlets that are in areas difficult to access regularly and that all of the accessible outlets will be flushed. The format of these records must be agreed by the Responsible Person.

APPENDIX 8

Legionella Management Meeting Schedule and Agenda

The Legionella Compliance Group shall meet on a Monthly basis and reports from this Group shall form a standing item at the University's Health and Safety Committee

Mandatory Attendance

- Responsible Person – Chair
- Deputy Responsible Person
- Nominated Persons
- Representative from the University's Appointed Contractor

Right of Attendance

- Head of Safety – attendance at specified Internal Audit meetings/ ad hoc at others
- Assistant Director - Estates – attendance at least quarterly
- Representative from the University's Occupational Health Provider – at least quarterly
- Account Manager from the University's Appointed Contractor attend at least quarterly
- Assistant Director - Operations – attendance at specific review meetings
- Assistant Director – Hospitality – attendance at specific review meetings
- Procurement representative

APPENDIX 9

Suggested Monitoring Regime Timescales

SERVICE	TASK	FREQUENCY	CARRIED OUT BY
CALORIFIERS	Inspect internally by removing the inspection hatch	Annually, or as indicated by rate of fouling	
	If no inspection hatch, purge debris to a suitable drain. Collect initial flush of hot water heaters to inspect clarity, quantity of debris and temp	Annually or as indicated by risk assessment or inspection findings	
HOT WATER SERVICE	For non-circulating systems: take temperatures at sentinel points (nearest outlet, furthest outlet and long branches to outlets) to confirm they are at a minimum of 50 °C within one minute	Monthly	
	For circulating systems: take temperatures at return legs of principal loops (sentinel points) to confirm they are at a minimum of 50 °C. Temperature measurements may be taken on the surface of metallic pipework	Monthly	
	For circulating systems: take temperatures at return legs of subordinate loops, temperature measurements can be taken on the surface of pipes, but where this is not practicable, the temperature of water from the last outlet on each loop may be measured and this should be greater than 50 °C within one minute of running (55 °C in healthcare premises). If the temperature rise is slow, it should be confirmed that the outlet is on a long leg and not that the flow and return has failed in that local area	Quarterly	
	All HWS systems: take temperatures at a representative selection of other points (intermediate outlets of single pipe systems and tertiary loops in circulating systems) to confirm they are at a minimum of 50 °C (55 °C in healthcare premises) to create a temperature profile of the whole system over a defined time period	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for legionella control	
COLD WATER TANKS	Inspect cold water storage tanks and carry out remedial work where necessary	Annually	
	Check the tank water temperature remote from the ball valve and the incoming mains temperature. Record the maximum temperatures of the stored and supply water recorded by fixed maximum/minimum thermometers where fitted	Annually (Summer) or as indicated by the temperature profiling	
COLD WATER SERVICES	Check temperatures at sentinel taps (typically those nearest to and furthest from the cold tank, but may also include other key locations on long branches to zones or floor levels). These outlets should be below 20 °C within two minutes of running the cold tap. To identify any local heat gain, which might not be apparent after one minute, observe the thermometer reading during flushing	Monthly	

	Take temperatures at a representative selection of other points to confirm they are below 20 °C to create a temperature profile of the whole system over a defined time period. Peak temperatures or any temperatures that are slow to fall should be an indicator of a localised problem	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for legionella control	
	Check thermal insulation to ensure it is intact and consider weatherproofing where components are exposed to the outdoor environment	Annually	
SHOWERS AND SPRAY TAPS	Dismantle, clean and descale removable parts, heads, inserts and hoses where fitted	Quarterly or as indicated by the rate of fouling or other risk factors	
INFREQUENTLY USED OUTLETS	Consideration should be given to removing infrequently used showers, taps and any associated equipment that uses water. If removed, any redundant supply pipework should be cut back as far as possible to a common supply (e.g. to the recirculating pipework or the pipework supplying a more frequently used upstream fitting) but preferably by removing the feeding 'T' Infrequently used equipment within a water system (i.e. not used for a period equal to or greater than seven days) should be included on the flushing regime Flush the outlets until the temperature at the outlet stabilises and is comparable to supply water and purge to drain Regularly use the outlets to minimise the risk from microbial growth in the peripheral parts of the water system, sustain and log this procedure once started	Weekly, or as indicated by the risk assessment	
TMVs	Risk assess whether the TMV fitting is required, and if not, remove. Where needed, inspect, clean, descale and disinfect any strainers or filters associated with TMVs To maintain protection against scald risk, TMVs require regular routine maintenance carried out by competent persons in accordance with the manufacturer's instructions.	Annually or on a frequency defined by the risk assessment	
EXPANSION VESSELS	Where practical, flush through and purge to drain. Bladders should be changed according to the manufacturer's guidelines or as indicated by the risk assessment	Monthly–six monthly, as indicated by the risk assessment	
POU WATER HEATERS (NO GREATER THAN 15L)	Check water temperatures to confirm the heater operates at 50–60 °C (55 °C in healthcare premises) or check the installation has a high turnover	Monthly–six monthly, or as indicated by the risk assessment	
COMBINATION WATER HEATERS	Inspect the integral cold water header tanks as part of the cold water storage tank inspection regime, clean and disinfect as necessary. If evidence shows that the unit regularly overflows hot water into the integral cold water header tank, instigate a temperature monitoring regime to determine the frequency and take precautionary measures as determined by the findings of this monitoring regime	Annually	
	Check water temperatures at an outlet to confirm the heater operates at 50–60 °C	Monthly	

BASE EXCHANGE SOFTENERS	Visually check the salt levels and top up salt, if required. Undertake a hardness check to confirm operation of the softener	Weekly, but depends on the size of the vessel and the rate of salt consumption	
	Service and disinfect	Annually, or according to manufacturer's guidelines	

HSE ACOP L8

APPENDIX 10

Action in response to legionella counts in hot and cold domestic water systems

Legionella bacteria (cfu/l)	Recommended actions
>100 cfu/l and up to 1000	Either: <ul style="list-style-type: none"><li data-bbox="459 703 1380 853">■ if the minority of samples are positive, the system should be resampled. If similar results are found again, a review of the control measures and risk assessment should be carried out to identify any remedial actions necessary or<li data-bbox="459 860 1380 1048">■ if the majority of samples are positive, the system may be colonised, albeit at a low level. An immediate review of the control measures and risk assessment should be carried out to identify any other remedial action required. Disinfection of the system should be considered
>1000 cfu/l	The system should be resampled and an immediate review of the control measures and risk assessment carried out to identify any remedial actions, including possible disinfection of the system. Retesting should take place a few days after disinfection and at frequent intervals afterwards until a satisfactory level of control is achieved.

Take from HSG 274 Part 2: The control of legionella bacteria in hot and cold water systems

APPENDIX 11

Plan of Action in the event of an outbreak or suspected or microbiologically diagnosed case of Legionnaires' disease linked to the University of Worcester:

In the event of a suspected or microbiologically diagnosed case of Legionnaires' disease the Head of Safety will take the lead in coordinating the response and the following should be treated as a template but not a rigid set of actions. If an investigation is instigated by the HSE, full cooperation will be given and no action will be taken to intentionally obstruct or hinder any investigation. The priority will be to identify any source of exposure, take immediate action to make safe and implement additional measures where necessary.

ACTION 1

Head of Safety will liaise with the notifying medical practitioner and/or PHE to confirm the diagnosis, possible place of acquisition and any other information that may help with the investigation. Offer full assistance to any investigation

ACTION 2

The Head of Safety will inform:

1. Director of Estates and Facilities
2. Assistant Director of Estates and Facilities
3. Director of HR (to liaise with Occupational Health as necessary)
4. Responsible Person (Legionella)
5. Vice-Chancellor & Chief Executive
6. Press Office
7. University Legal Advisor
8. Student Services
9. HSE in accordance with RIDDOR if necessary

ACTION 3

The Head of Safety and Responsible Person (Legionella) will immediately convene a meeting with other relevant attendees to:

- a. Consider the movements of the patient(s) during the period of exposure to identify potential sources of exposure both on campus and off
- b. Formulate an initial action plan to ensure that any part of the water system capable of exposing the patient to legionella bacteria at the University is shut down immediately,
- c. Arrange for an 'Appointed Contractor' to carry out sampling and once the source of the exposure has been identified, carry out emergency treatment of that system in agreement with the HSE/PHE

ACTION 4

The Responsible Person, in consultation with the Contractor, will review the Risk Assessment and the precautionary measures in the written scheme.

ACTION 5

A Task Force will be set up to review the incident, debrief and decide what additional safeguards can be implemented. The Task Force would normally include:

- Head of Safety
- Director of HR
- Appointed Contractor
- Responsible Person (Legionella)
- Assistant Director – Estates

APPENDIX 12

Actions to be taken in the case of a water supply giving a positive legionella test result (in conjunction with Appendix 10)

ACTION 1

The Water Treatment Contractor, or nominated University staff member authorised to take water samples, will inform the Responsible Person (Legionella) for that site and the other members of the Control Team.

ACTION 2

The Responsible Person (Legionella), in consultation with the Contractor, will immediately arrange for the disinfection and/or pasteurisation of the relevant water system. The Responsible Person (Legionella) or an appointed specialist should supervise remedial actions. If there is any doubt whatever about how to achieve the eradication, specialist assistance must be sought. The Contractor will issue a certificate of disinfection to the Responsible Person upon completion.

ACTION 3

The Responsible Person (Legionella) will convene a meeting to consider the urgency and extent of the remedial action to be taken. Included in the meeting will be: the Responsible Person (Legionella); the Deputy Responsible Person (Legionella) and, where relevant, the Nominated Person for that area of the University. The Head of Safety, Assistant Director – Estates and the Director of Estates and Facilities will be made aware of the findings.

ACTION 4

The Contractor will confirm the efficacy of the disinfection by re-sampling the system for Legionella analysis.

ACTION 5

The Responsible Person will inform the relevant University staff members that the system should be kept out of use until the water sample is shown to be Legionella negative.

ACTION 6

The Responsible Person, in consultation with the Contractor, will review the Risk Assessment and the precautionary measures in the written scheme.

ACTION 7

The Responsible Person, in conjunction with the Contractor, will identify and implement any necessary remedial actions.

ACTION 8

When the re-sampling of the system has shown it to be Legionella-free, the Contractor will notify the Responsible Person that the system can be returned to normal use.

ACTION 9

The Responsible Person and the Contractor will ensure that all Legionella test reports, disinfection certificates, records of works and other relevant documentation are copied to the site logbook and the Contractor's client file.