



## **AZSPU Legionella Control Management Programme**

**AZSPU-HSSE-DOC-00259-2**

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## 1.0 Purpose/Scope

This document gives advice concerning the risk from exposure to Legionella bacteria.

Legionnaires' disease is a potentially fatal form of pneumonia which can affect anybody, but which principally affects those who are susceptible because of age, illness, immunosuppression, smoking, etc. Legionella bacteria can also cause less serious illnesses which are not fatal or permanently debilitating, e.g. Pontiac or Lochgillhead fevers.

Legionella bacteria are common and can be found naturally in environmental water sources such as rivers, lakes and reservoirs, usually in low numbers. As Legionella bacteria are commonly encountered in environmental sources they may eventually colonise manufactured water systems and be found in cooling tower systems, hot and cold water systems and other plant which use or store water. To reduce the possibility of creating conditions in which the risk from exposure to Legionella bacteria is increased, it is important to control the risk by introducing measures which:

- Do not allow proliferation of the organisms in the water system; and
- Reduce so far as reasonably practicable, exposure to water droplets and aerosol.

This controlled document applies to Azerbaijan Strategic Performance Unit (SPU) engaged in the exploration, drilling, production and transportation of oil; including all related activities.

## 2.0 General Requirements and principles

2.1 Requirements for identifying, assessing, and controlling health hazards are included in the following BP Group and International standards:

- BP Getting Health Right
- [OGP Managing health for field operations in oil & gas activities.](#)
- [Approved Code of Practice and guidance: 'The control of Legionella bacteria in water systems'](#)
- Control of Substances Hazardous to Health Regulations (COSHH)

## 2.2 Principles

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The principles of Legionella Risk Prevention Program are following:

- Minimize the risk to human health and the environment.
- Consider cost-effectiveness and operational feasibility.
- Consider community values.
- Take a leadership role by educating employees and contractors and promoting an environmentally-sound, integrated approach to Legionella Risk Prevention (LRP) management.
- Apply Legionella Risk Prevention principles when planning, designing, constructing and renovating projects.
- Ensure accountability in water system treatment chemical use through regular risk assessment and reporting system.
- Applying sparing and safe methods of the best international practice

### **3.0 Legionella control**

#### **3.1 Legionella risk assessments**

To prevent the occurrence of legionnaire's disease, companies which operate purpose-built water systems (e.g. BP AzSPU, contractors, etc.) must comply with regulations, requiring them to manage, maintain and treat them properly. This means that a risk assessment must be carried out to determine which systems pose a threat and whether the water must be treated and the system cleaned regularly.

All workplaces will have water systems which should be taken account of within the water treatment risk assessment. Examples include:

- Drinking water: normally an open circuit direct from the mains supply to tap outlets but can also be supplied to vending machines, water fountains or coolers;
- Domestic cold water: normally an open circuit with tanked storage
- Domestic hot water; normally an open circuit supplied from point of use heaters, or from hot water storage devices e.g. immersion heaters or calorifiers with and without tanked cold water storage

- Low pressure hot water heating: either closed circuit or tanked header
- Medium pressure hot water heating: closed circuit
- Chilled water: closed circuit
- Evaporative condenser cooling water: open and closed circuits
- Humidifier water: open and closed circuit
- Cooling towers: open and closed circuits
- Fire sprinkler and hose reel water: open circuit

There are also less commonly encountered water systems including spa baths and pools, steam boilers, car/bus washes, air washers, wet scrubbers, machine tool coolant systems, ornamental fountains and water features, horticultural irrigation and misting systems, emergency showers and eye wash sprays.

The risk assessment should achieve the following:

- Identification of all systems that poses a risk
- An assessment of the risks from exposure to Legionella bacteria and other relevant biological or chemical agents associated with all these water systems
- Compliance with AzSPU Water quality assurance programme and establishment of records system for the prevention and control of the risks
- A system to ensure that risk assessments are reviewed at least every two years, or following an incident

See also key documents section: Legionella - guide to risk assessment

### **3.2 Water testing:**

[Ref. AzSPU Water quality management programme](#)

### **3.3 Water treatment:**

[Ref. AzSPU Water quality management programme](#)

### **3.4 Monitoring:**

[Ref. Legionella guide to water sampling and analytical techniques](#)

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### **3.5 Education and information:**

[Ref. Legionella guide to information and training](#)

### **3.6 Recordkeeping:**

[Ref. Legionella guide to recordkeeping](#)

## **4.0 Key responsibilities**

In many instances the overall responsibility, the associated duties, and the operational procedures, in respect of compliance with the regulations may fall to separate parties.

### **4.1 Health Team Industrial Hygienists or Technical Authority assigned by Health Manager shall**

- Periodically review and update this programme.
- Assess and evaluate Legionella Risk Prevention contractor and its compliance with the requirements as outlined in this document and best international standards.
- Ensure the ongoing monitoring and risk assessment of the adequacy of the existing Legionella Risk Prevention provisions.
- Review and audit Legionella Risk Prevention contractor activities to ensure acceptable standards are being applied and all relevant Environmental aspects encountered.
- Periodically (annual basis) review contractor qualifications and performance.
- Providing information and advice on new / forthcoming legislation or measures to improve pest control services.
- Ensuring lessons learned and best practices are communicated between operational site
- Ensure adequate training programme identified
- Ensure all those involved in the process of Legionella control on sites are trained.

### **4.2 BP Site Manager shall**

- Ensure that a risk assessment is undertaken and maintained for all water systems presenting a reasonably foreseeable risk of exposure to Legionella bacteria and also for work activities that may lead to an exposure to Legionella bacteria

- Ensure control measures and other precautions, including any remedial actions as recommended by the risk assessment are implemented and maintained to protect all personnel from exposure to Legionella bacteria
- Confirm the necessary monitoring and system checks are undertaken to ensure that the controls remain effective and action is taken to rectify any deficiencies.
- Define responsibilities and document an effective communication process for all relevant parties, including contractors, involved in assessing the risk, implementing and maintaining the control measures and conducting monitoring and system checks.
- Ensure that BP personnel involved in the Legionella control programme are suitably informed, instructed and trained, and when required that they engage competent, qualified and experienced contractors.
- Establish adverse incident management protocol and have arrangements in place to ensure they are informed of any adverse incidents, e.g. a microbiological result exceeding specified action levels, any incident with potential to significantly increase the risk of legionellosis or a case or suspected case of legionellosis.
- Act as the focal point for work, related to Legionella control and co-ordinate Legionella control activities on site.
- Ensure all opportunities for proactive Legionella risk management are given due consideration when new water systems are installed or existing systems are modified or refurbished.
- Ensure all required notifications relating to Legionella control activities (e.g. cooling tower registration, are made to relevant authorities in a timely manner.
- Ensure all related record keeping is maintained.
- Audit the risk management and control programme on a regular basis and provide a written report of such audits.

#### **4.3 Site HSE Advisors and PU Health Advisors**

- Conduct Legionella risk assessments at their site with guidance of the Central IH staff
- Identify and assess sources of risk on their respective sites. This includes checking whether conditions are present which will encourage bacteria to multiply.
- Implementing the scheme of prevention and or controlling the risks. Implement, manage and monitor precautions.
- Monitor work at their sites to ensure that specified health hazard controls are being implemented.
- Ensure regular water testing following the schedule as per AzSPU Water quality assurance programme takes place.
- Keep records of the precautions

#### 4.4 Site Employees shall

- Complete assigned health hazard communication training.
- Assure hazards have been assessed for tasks they are about to do.
- Apply controls further to water and cooling systems' assessments
- Notify supervisors when controls are unclear, non-functioning, or unworkable for the task.

#### 4.5 Maintenance contractors

The responsibilities of water treatment and maintenance companies in implementing and maintaining the control measures should be determined by the BP responsible person (Legionella management programme technical authority) and incorporated into a service agreement. Specific duties will be dependent on the type of water systems and BP site requirements, including:

- Maintain water treatment and cleaning regimes for higher risk systems, e.g. cooling towers, in accordance with the recommendations given in the risk assessment and required by the relevant national/local legislation to control exposure to Legionella bacteria.
- Maintain water systems and equipment in accordance with manufacturers instructions to ensure they can be operated safely and efficiency and risks of exposure to Legionella are minimized.
- Ensure they deploy competent and appropriately experienced and qualified personnel to carry out their duties.
- Ensure any non-compliances are rectified in a timely manner and deficiencies beyond their control are reported to the responsible person for action by others.
- Ensure all related record keeping is maintained.

#### 5.0 Procedure

Procedures by which all work on water systems which are, or are likely to be, contaminated with Legionella bacteria should be subject to a thorough, documented risk assessment.

Procedures by which all work on water systems which are, or are likely to be, contaminated with Legionella bacteria should be subject to a thorough, documented risk assessment. The site's Control of Work and Permit to Work program should explicitly address positive control of potential exposure to Legionella bacteria. This should include work which involves the potential for exposure to aerosols contaminated or likely to be contaminated with Legionella bacteria. Prior to permitting any work which may involve exposure to

contaminated aerosols, a risk assessment should be made addressing the risk of exposure to Legionella bacteria in addition to other hazardous substances (e.g. chemicals used during the cleaning operation), and the appropriate measures required to control exposure should be identified and implemented before the work is started. Control measures and methods should be documented, audited and approved by a competent person before a permit to work is approved

## **5.1 Risk Assessment – Guide (Appendix 1)**

Risk assessment format approved within AzSPU could be used for Legionella risk assessment purpose.

## **5.2 Hot & Cold Water Services Management checklist ([Appendices 2/2.1](#))**

## **5.3 Cooling system water management checklist ([Appendices 3/3.1/3.2/3.3](#))**

## **6.0 Information and Training**

The management of water systems requires some basic knowledge of the inherent risks and more specific training when responsible for managing and controlling risk of exposure to Legionella. Persons involved in Legionella management and control must be properly trained, ensuring that tasks undertaken are carried out in a safe and technically competent manner. A [training programme outlining general awareness for personnel involved in Legionella control is appended](#).

The level of competence required will be dependant upon the needs of the situation and the nature of the risks involved.

## **7.0 Record keeping**

The following records must be available for relevant site personnel and service providers:

- Contact details and reporting arrangements
- Water system asset list
- Risk assessment
- System data and schematics
- Written control scheme detailing precautionary measures and responsibilities, water quality control criteria and requirements for corrective actions
- Water management programme schedule
- Training and competency certificates
- Water treatment and equipment details
- Site testing and inspection reports
- Water treatment supplier reports

- Independent monitoring reports
- Cleaning / disinfecting reports
- Method statements
- Management review records
- Product information / Safety data sheets / COSHH assessments
- Local authority Notification (for cooling towers / evaporative condensers)
- Remedial and Emergency action procedures

## 7.1 Key Documents/Tools/References

1. [Guide to Legionellosis and Legionella](#)
2. [Legionella: Guide to Risk Control Schemes](#)
3. [Legionella: Guide to Emergency Response Plans](#)
4. [Legionella: Guide to Record Keeping](#)
5. [Guide to Legionella Control for Humidification Systems](#)
6. [Legionella awareness and management training](#)
7. [BP OMS Guidance for Legionella Control](#)
8. [Legionella: Guide to Risk Management Plans](#)
9. [Guide to Sampling and Analytical Techniques for Legionella](#)
10. [Guide to Duties of Responsible Persons and Contractors](#)
11. [Guide to Information and Training](#)
12. [Guide to Legionella control for Miscellaneous Systems](#)
13. [Guide to Regulations for Legionella Control](#)
14. [Guide to Legionella Control and Water Treatment Contracts](#)
15. [Guide to Legionella Control for Evaporative Cooling Systems](#)
16. [Legionnaires disease: approved code of practice and guidance](#)
17. [AzSPU Water quality management programme](#)



**APPENDIX 1*****Guide to Risk Assessment*****Introduction**

An assessment of risk of exposure to Legionella bacteria from a water system is required whenever:

- the condition of the water within any part of the system could permit proliferation of Legionella bacteria; and
- an aerosol could be created containing this water; and
- persons could inhale this aerosol.

The assessment should determine whether existing measures to prevent or minimise the risk of legionellosis are adequate and effective and, if not, to identify what further precautionary measures need to be taken. The assessment should also consider the susceptibility of those persons likely to be exposed to aerosols potentially contaminated with Legionella bacteria.

Given that legionella bacteria will, from time to time, find their way into and potentially colonise all water systems operating at water temperatures within the range 20-45C, this effectively means that all such systems (e.g. domestic hot & cold water systems, air conditioning systems, spas, fire fighting systems, etc.) should be considered to pose a significant risk. Other systems normally operating outside these temperatures but sometimes, e.g. during equipment shutdown or maintenance, are allowed to stand at ambient temperatures may also pose a risk and require a risk assessment. Where the BP leases or otherwise occupies premises managed by other persons, the BP Responsible Person should ensure that the landlord or managing agent for the premises can demonstrate a suitable and sufficient risk assessment for exposure to Legionella bacteria prior to occupation by the BP.

**Requirements**

Risks assessments must meet local legislative requirements and the assessment should, as a minimum, consider the following factors:

a) Water System Design and Condition

In addition to a description of the water system layout and operation, there should be an appraisal of the condition of component parts, paying particular attention to those factors which could support microbial growth, e.g. sludge, scale, debris, corrosion, fouling and the use of materials that can release nutrients for microbial growth. There should also be an assessment of the suitability of system design for prevention of water stagnation and contamination, e.g. dead legs or blind ends, standby pumps and plant, water holding capacity and turnover, and poorly fitting covers and screens on water storage tanks. The

assessment should also consider the adequacy of measures for minimising aerosol generation and preventing exposure, e.g. drift eliminators on cooling towers, and removal of redundant or infrequently used showers.

#### b) Water Quality

An internal visual inspection can tell the assessor a great deal about the water quality, e.g. presence of slimes, cloudiness, etc. However, the lack of these visual indicators does not necessarily mean that the water will be of a satisfactory standard in terms of its bacteriological and chemical qualities. Whilst microbiological monitoring is not always required to support a risk assessment, if properly done, it can provide a certain degree of assurance, particularly where such sampling is not already routinely undertaken as part of a written control scheme, and should always be used where there is cause for concern or to support investigations into adverse incidents. Water sampling and analysis are discussed in BP Guide Sampling and Analytical Techniques.

#### c) Water Temperature

As Legionella bacteria are much more likely to proliferate where water temperatures are between 20 to 45°C for prolonged periods, water temperature monitoring should be used to identify parts of the system where such temperatures occur and whether they significantly contribute to the risks present. Where alternative measures, e.g. biocide dosing in cooling towers, are used to control bacteriological growth then the risk assessor should confirm the adequacy of such measures by reference to test results from on-site records and where required carry out confirmatory testing.

#### d) Written Scheme of Maintenance and Monitoring

As risk assessments are only a snap-shot in time and may not be reviewed for anything up to 24 months, the assessment should critically review the suitability of the written scheme to control the risk of exposure to Legionella bacteria over this period from such influences as, for example, the adequacy of supporting management arrangements, changes in plant operating conditions and seasonal effects.

#### e) Record Keeping

The assessment should review all relevant records since the previous assessment/audit took place to check that the system is being adequately managed, including the water quality logbook, remedial action implementation records, availability and suitability of schematic or other plans/drawings of the system, compliance with the written scheme and the safety management arrangements (e.g. adverse incident records and their management).

#### f) Management Arrangements

The assessment should review the suitability of the appointments in place to manage the risks and of the arrangements in place to manage adverse incidents, including those for assessing reporting and implementing emergency mitigation measures, and procedures to communicate the risk to potentially affected persons.

The level of detail of the assessment should reflect the degree of risk present, providing prioritised recommendations for remedial action where the risks identified are unacceptable. As can be seen from points a) to f) above, it is important that the risk assessment is not considered as simply a system condition survey, but assesses the suitability of all aspects of the management of this risk.

The risk assessor should be independent of those who supply water treatment, cleaning and disinfection and other related contract services so as to avoid conflicts of interest. Assessment of complex water systems will require specialist input from experienced risk assessors with knowledge of environmental microbiology, system design and engineering and water quality.

The system assessment should be kept up to date and reviewed at least every two years.

## Hot & Cold Water Services Management Checklist

*This checklist reflects good practice but should not take precedence over local regulations if more stringent.*

Location:

Name of Auditor:

Date of Audit:

Date of Review (minimum 2 yearly):

### Section 1 – Risk Assessment

- |   |                                      |                                      |
|---|--------------------------------------|--------------------------------------|
| 1. Is there any relevant National, State, or Regional Legislation or Codes of Practice etc., at your location, which address legionella issues?   | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| 2. Has elimination of the risk been considered?   | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| 3. Was the person undertaking the assessment competent, or did they have access to advice and guidance from a suitable competent person, during the assessment process?                   | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| 4. Have the significant findings of the assessment been recorded?   | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| 5. Has there been consultation with employees, relevant contractors, JV partners etc. on the assessment and recommended control measures?   | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| 6. Does the assessment include identification of circumstances that would require the assessment to be reviewed?  | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| 7. Is there a suitable “single point of accountability” (SPA) identified and recorded who will be responsible for managing or coordinating the legionella prevention & control programme? | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |

- |   |                          |                          |
|---|--------------------------|--------------------------|
|   | <b>Y</b>                 | <b>N</b>                 |
| 8. Does the above SPA have a nominated deputy?  | <input type="checkbox"/> | <input type="checkbox"/> |
|   | <b>Y</b>                 | <b>N</b>                 |
| 9. Are contact details of the above persons readily available – for instance in the event of an emergency (see Q62)?  | <input type="checkbox"/> | <input type="checkbox"/> |
|   | <b>Y</b>                 | <b>N</b>                 |
| 10. Are the roles & responsibilities of all persons involved in the legionella prevention & control programme defined in writing – this includes contractors and others?    | <input type="checkbox"/> | <input type="checkbox"/> |
|   | <b>Y</b>                 | <b>N</b>                 |
| 11. Have they all been trained appropriately?   | <input type="checkbox"/> | <input type="checkbox"/> |
|   | <b>Y</b>                 | <b>N</b>                 |
| 12. Is there a written procedure for the above training programme, which includes refresher training and measures/assesses competency?                                      | <input type="checkbox"/> | <input type="checkbox"/> |
|   | <b>Y</b>                 | <b>N</b>                 |
| 13. Has the competency of any contractors or third parties, such as laboratories etc, involved in any aspect of the legionella prevention & control programme been checked? | <input type="checkbox"/> | <input type="checkbox"/> |
|   | <b>Y</b>                 | <b>N</b>                 |
| 14. Have all other HSE issues been considered? –  | <input type="checkbox"/> | <input type="checkbox"/> |

## Section 2 – Type of System(s)

Tick as Appropriate

- Gravity without recirculation ☐
- Gravity with recirculation ☐
- Pressurised ☐
- Other (describe below) ☐

**Section 3 – Risk Management Programme**

15. Is there a written risk management programme, which covers the control of risks associated with any exposures to legionella bacteria?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
16. Is an up-to-date plan of the system included?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
17. Does the plan show and identify: -	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• All system plant, for example water softeners, filters, pumps, non-return valves and all outlets, i.e. showers wash hand basins etc.?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• All system isolation valves	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• All standby equipment, e.g. spare pumps etc.?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• The location of system bleed valves?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• All associated storage and header tanks?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• All associated pipe work?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• The location of chemical dosing points and/or injection points	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• The location of the system drain valve?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• The origin of the water supply?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• Any parts which may be capable of being taken temporarily out of use?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>

	Y	N
18. Does the programme contain all relevant operating, cleaning & maintenance procedures and instructions (see Q)?	<input type="checkbox"/>	<input type="checkbox"/>

19. Does the programme detail the steps necessary to control the risk of exposure to legionella bacteria (see Q36-40)?	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------

20. Does the programme list details of the types and frequencies of checks/tests necessary to ensure that the programme remains effective	<input type="checkbox"/>	<input type="checkbox"/>
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(see Q41-52)?

#### Section 4 - Design & construction

	Y	N
21. In the case of installation of new, or extensive modification of existing, water services do the processes exist under your legionella prevention & control programme to:-	<input type="checkbox"/>	<input type="checkbox"/>

- Consider the use of only materials or fittings that cannot support the growth of microorganisms?

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

- Consider the use of low corrosion materials?

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

22. If fitted, are thermostatic mixing valves (TMVs) sited as close as possible to the point of use?	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------

NOTE ideally TMVs should not be fitted to multiple outlets, but if they are use, the mixed water pipe work should be kept as short as possible.

#### Cold water system

	Y	N
23. Are low use outlets installed upstream of higher use outlets?	<input type="checkbox"/>	<input type="checkbox"/>

24. Has cold-water storage been assessed and minimised, i.e. holds enough for a day's use only?	<input type="checkbox"/>	<input type="checkbox"/>
---	--------------------------	--------------------------

25. Is all piping insulated and kept away from heat sources (wherever possible)?	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------

26. Is the cold-water tank:-

- |  | <b>Y</b>                 | <b>N</b>                 |
|--|--------------------------|--------------------------|
| • Fitted with a cover and insect screen(s) on any pipe work or vents open to the atmosphere? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Located in a cool place and protected from extremes of temperature?                        | <input type="checkbox"/> | <input type="checkbox"/> |
| • Accessible?  | <input type="checkbox"/> | <input type="checkbox"/> |

**Hot water system**

- |   | <b>Y</b>                 | <b>N</b>                 |
|---|--------------------------|--------------------------|
| 27. Does the calorifier storage capacity meet daily fluctuations in hot water use while maintaining a supply temperature of at least 50° C? | <input type="checkbox"/> | <input type="checkbox"/> |
| 28. Are the hot water distribution pipes insulated?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 29. If more than one calorifier is used, are they connected in parallel?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 30. Does the calorifier have the following fitted:-   | <b>Y</b>                 | <b>N</b>                 |
| • Drain valve?  | <input type="checkbox"/> | <input type="checkbox"/> |
| • Inlet & Outlet Temperature Gauge?   | <input type="checkbox"/> | <input type="checkbox"/> |
| • Access Panel?   | <input type="checkbox"/> | <input type="checkbox"/> |

**Section 5 - Operation and maintenance**

- |   | <b>Y</b>                 | <b>N</b>                 |
|---|--------------------------|--------------------------|
| 31. If the water supplied to your building is not mains supply, has the water been pre-treated to make sure it is the same quality as | <input type="checkbox"/> | <input type="checkbox"/> |

mains-supplied water?

	<b>Y</b>	<b>N</b>
32. Is the entire content of the calorifier, including the base, heated to 60°C for an hour each day, for example by using a shunt pump?	<input type="checkbox"/>	<input type="checkbox"/>

	<b>Y</b>	<b>N</b>
33. Are all outlets that are no longer required, cut back as far as the main pipe run?	<input type="checkbox"/>	<input type="checkbox"/>

	<b>Y</b>	<b>N</b>
34. Are there procedures in place to operate standby equipment e.g. calorifiers, pumps etc., into routine use?	<input type="checkbox"/>	<input type="checkbox"/>

	<b>Y</b>	<b>N</b>
35. If little used outlets have not been removed, are there arrangements in place to either	<input type="checkbox"/>	<input type="checkbox"/>

- Flush them through on at least a weekly basis (with records kept of this)?

or

- carry out a safe purge of stagnant water before use

NOTE It is important that this purge is carried out with the minimum production of aerosols, e.g. by piping directly into a drain.

	<b>Y</b>	<b>N</b>
	<input type="checkbox"/>	<input type="checkbox"/>

36. If thermostatic mixing valves are fitted, are they included in the maintenance schedule?

#### Section 6 - Water treatment programme

	<b>Y</b>	<b>N</b>
37. Is there a water treatment regime in place?	<input type="checkbox"/>	<input type="checkbox"/>

	<b>Y</b>	<b>N</b>
38. Is temperature used as a control method?	<input type="checkbox"/>	<input type="checkbox"/>

	<b>Y</b>	<b>N</b>
39. Are biocides used as a control method?	<input type="checkbox"/>	<input type="checkbox"/>

Provide details of the methods used below.

## Section 7 – Monitoring

### Temperature

	<b>Y</b>	<b>N</b>
40. If there is a risk of scalding are thermostatic mixing valves fitted?	<input type="checkbox"/>	<input type="checkbox"/>

	<b>Y</b>	<b>N</b>
41. Is the temperature of sentinel hot and cold water outlets checked on a monthly basis (The first and last taps on a recirculating system)?	<input type="checkbox"/>	<input type="checkbox"/>

NOTE for cold water the temperature should be 20°C or below and for hot water, at least 50°C.

	<b>Y</b>	<b>N</b>
42.		
43. If fitted, is the temperature of the water supply to thermostatic mixing valves checked on a monthly basis?	<input type="checkbox"/>	<input type="checkbox"/>

	<b>Y</b>	<b>N</b>
44. Is the temperature of the water in the outlet and return pipes of the calorifier checked on a monthly basis?	<input type="checkbox"/>	<input type="checkbox"/>

NOTE calibrated temperature measurement devices should additionally be used, at an appropriate interval (at least annually) to crosscheck Calorifier temperature gauges and any deviations corrected and recorded.

	<b>Y</b>	<b>N</b>
45. Is the temperature of the incoming cold water supply checked on a six monthly basis?	<input type="checkbox"/>	<input type="checkbox"/>

	<b>Y</b>	<b>N</b>
46. Is the temperature of a representative number of hot and cold outlets checked on an annual basis?	<input type="checkbox"/>	<input type="checkbox"/>

### Biocides

	<b>Y</b>	<b>N</b>
47. Is the control level required known and recorded in the system-operating manual?	<input type="checkbox"/>	<input type="checkbox"/>

	<b>Y</b>	<b>N</b>
48. Is the rate of release/rate of addition of biocide known and recorded?	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Y</b>	<b>N</b>
49. Is the concentration of the biocide at sentinel outlets checked on a monthly basis?	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Y</b>	<b>N</b>
50. Is the concentration of biocide checked at representative outlets on an annual basis?	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Y</b>	<b>N</b>
51. On an annual basis is there a:	<input type="checkbox"/>	<input type="checkbox"/>
• Visual check of the cold water tank and its contents?	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Y</b>	<b>N</b>
• Check to see if there is reasonable flow through the cold water tank, i.e. good tangential flow across the tank	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Y</b>	<b>N</b>
• Drain down of the calorifier and a check for debris	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Y</b>	<b>N</b>
• Check on the plans for the hot & cold water circuits to make sure they are up-to-date?	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Y</b>	<b>N</b>
• Check on the existence of all water connections to outside services	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Y</b>	<b>N</b>
52. Are all test results and checks recorded together with details of any remedial actions taken (this should include identification of the people involved).	<input type="checkbox"/>	<input type="checkbox"/>
<b>Microbiological</b>		
	<b>Y</b>	<b>N</b>
53. Are there procedures in place to identify circumstances where either general microbiological monitoring or sampling for legionella would be appropriate?	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Y</b>	<b>N</b>
54. If there are procedures in place, do these identify where samples should be taken and the frequency and actions required?	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Y</b>	<b>N</b>
55. Are all check and test results examined on a regular basis to identify and investigate any trends?	<input type="checkbox"/>	<input type="checkbox"/>

**Section 8 - Cleaning & Disinfection**

- |  |                          |                          |
|--|--------------------------|--------------------------|
|  | <b>Y</b>                 | <b>N</b>                 |
| 56. Have the circumstances when cleaning & disinfection of the water services would be appropriate been identified?    | <input type="checkbox"/> | <input type="checkbox"/> |
| 57. If cleaning were to be carried out which of the following methods would be used                                    | <b>Y</b>                 | <b>N</b>                 |
| • Thermal  | <input type="checkbox"/> | <input type="checkbox"/> |
| • Chemical   | <b>Y</b>                 | <b>N</b>                 |
| •  | <input type="checkbox"/> | <input type="checkbox"/> |
| 58. Are procedures in place for the chosen method of cleaning and disinfection?  | <b>Y</b>                 | <b>N</b>                 |
|  | <input type="checkbox"/> | <input type="checkbox"/> |
| 59. Does the cleaning & disinfection procedures include:-  |                          |                          |
| • Initial concentration of biocide in use for the pre- and post-cleaning disinfection stages?                          | <b>Y</b>                 | <b>N</b>                 |
|  | <input type="checkbox"/> | <input type="checkbox"/> |
| • Contact time for each disinfection stage?  | <b>Y</b>                 | <b>N</b>                 |
|  | <input type="checkbox"/> | <input type="checkbox"/> |
| • Methods for carrying out cleaning?   | <b>Y</b>                 | <b>N</b>                 |
|  | <input type="checkbox"/> | <input type="checkbox"/> |
| 60. Are measures taken to protect any person involved in the cleaning & disinfection of the system? – list these below | <b>Y</b>                 | <b>N</b>                 |
|  | <input type="checkbox"/> | <input type="checkbox"/> |

**Section 9 - Actions in the Event of an Emergency**

- |  |                          |                          |
|--|--------------------------|--------------------------|
|  | <b>Y</b>                 | <b>N</b>                 |
| 61. Have plans been drawn up which investigate the potentially affected areas should an outbreak of infection occur and specify appropriate communications with local authorities? | <input type="checkbox"/> | <input type="checkbox"/> |
| 62. Are these plans fully explained in the system-operating manual?  | <b>Y</b>                 | <b>N</b>                 |
|  | <input type="checkbox"/> | <input type="checkbox"/> |

63. Are all emergency contacts and external communication routes identified and recorded in the operating manual?

**Y**  
☐

**N**  
☐

*Actions arising*

A simple proforma that can be used to record and track actions arising is appended.

**Appendix 2.1****Action Register**

*All actions identified should be entered into this Form, together with a target date and details of the person to whom the action has been assigned. This form should be reviewed regularly to ensure that all actions are completed. Target dates should not be allowed to pass without comment or re-scheduling.*

**Location:**.....

Action Item	By Date	By Whom	Completed	Comments

**Name of Auditor:**..... **Signature:**..... **Date:**.....

**Actions Approved by:**..... **Date:**.....

---

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## Cooling Water Management Checklist

*This checklist reflects good practice but should not take precedence over local regulations if more stringent.*

Location:

Name of Auditor:

Date of Audit:

Date of Review (minimum 2 yearly):

### Section 1 – Risk Assessment

- |  | Y                        | N                        |
|--|--------------------------|--------------------------|
| 64. Is there any relevant National, State, or Regional Legislation or Codes of Practice etc., at your location, which address legionella issues?                         | <input type="checkbox"/> | <input type="checkbox"/> |
| 65. Has prevention (elimination or substitution) of the risk been considered?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 66. Was the person undertaking the assessment competent, or did they have access to advice and guidance from a suitable competent person, during the assessment process? | <input type="checkbox"/> | <input type="checkbox"/> |
| 67. Have the significant findings of the assessment been recorded?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 68. Has there been consultation with employees, relevant contractors, JV partners etc. on the assessment and recommended control measures?                               | <input type="checkbox"/> | <input type="checkbox"/> |
| 69. Does the assessment include identification of circumstances that would require the assessment to be reviewed?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 70. Is there a suitable “single point of accountability” (SPA) identified and recorded who will be responsible for managing or   | <input type="checkbox"/> | <input type="checkbox"/> |

coordinating the legionella prevention & control programme?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

71. Does the above SPA have a nominated deputy?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

72. Are contact details of the above persons readily available – for instance in the event of an emergency (see Q61)?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

73. Are the roles & responsibilities of all persons involved in the legionella prevention & control programme defined in writing – this includes contractors and others?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

74. Have they all been trained appropriately?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

75. Is there a written procedure for the above training programme, which includes refresher training and measures/assesses competency?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

76. Has the competency of any contractors or third parties, such as laboratories etc, involved in any aspect of the legionella prevention & control programme been checked?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

77. Have all other HSE issues been considered? – (e.g. health risk assessments for handling water treatment chemicals, manual handling, ergonomics, working at heights, working above water, working in confined spaces, working with electricity, lock out tag out, environmental discharges etc.).

## Section 2 – Cooling Towers

Record details of **all** cooling towers (i.e. make, model, year of manufacture, type, construction materials, plans, Engineer Finished Drawing's etc.)

--	--

78. Have the cooling towers been notified to your local authority? (in some areas legislation requires that location and usage details are provided to local authorities – elsewhere this should be considered as good practice)	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
--	--------------------------------------	--------------------------------------

**Section 3 – Risk Management Programme**

79. Is there a written risk management programme, which covers the control of risks associated with any exposures to legionella bacteria?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
---	--------------------------------------	--------------------------------------

80. Is an up-to-date plan of the system included?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
---	--------------------------------------	--------------------------------------

81. Does the plan show: -	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• All cooling towers?		

• All system control valves	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
-----------------------------	--------------------------------------	--------------------------------------

• All standby equipment, e.g. spare pumps etc.?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
---	--------------------------------------	--------------------------------------

• The location of system bleed valves?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
--	--------------------------------------	--------------------------------------

• All associated storage tanks?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
---------------------------------	--------------------------------------	--------------------------------------

• All associated pipe work?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
-----------------------------	--------------------------------------	--------------------------------------

• The location of chemical dosing points and/or injection points	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
--	--------------------------------------	--------------------------------------

• The location of the system drain valve?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
---	--------------------------------------	--------------------------------------

• The origin of the water supply?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
-----------------------------------	--------------------------------------	--------------------------------------

• Any parts which may be capable of being taken temporarily out of use?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
82. Does the programme contain all relevant operating, cleaning & maintenance procedures and instructions (see Q31-35 & Q53 - 58)?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
83. Does the programme detail the steps necessary to control the risk of exposure to legionella bacteria (see Q36-40)?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
84. Does the programme list details of the types and frequencies of checks/tests necessary to ensure that the programme remains effective (see Q41-52)?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
<b>Section 4 - Cooling systems: Design &amp; construction</b>		
85. In the case of installation of new, or extensive modification of existing, cooling towers do the processes exist under your legionella prevention & control programme to consider the location of any new tower(s) in relation to:	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• Air conditioning & ventilation inlets?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• Opening windows	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
• Occupied areas (consider local population densities and proximity to people who may have greater vulnerability to infection i.e. hospitals, care homes etc.)?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
86. Are towers constructed from impervious materials?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
87. Are drift eliminators fitted?	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>
88. Are such drift eliminators: -	<b>Y</b> <input type="checkbox"/>	<b>N</b> <input type="checkbox"/>

• Fitted correctly? **Y**  
☐ **N**  
☐

• Effective? **Y**  
☐ **N**  
☐

•  
NOTE drift eliminators will not completely stop any drift, but should reduce it significantly. Eliminators that control the release of small water droplets should be used – wooden slats cannot achieve this and should be replaced.

**Y**  
☐ **N**  
☐

89. Is the area above the pond as enclosed as possible?

90. Are all surfaces visibly free from significant levels of:-

**Y**  
☐ **N**  
☐

• Slime or algae? **Y**  
☐ **N**  
☐

• Scale? **Y**  
☐ **N**  
☐

• Corrosion? **Y**  
☐ **N**  
☐

**Y**  
☐ **N**  
☐

91. Is the water correctly distributed and does it flow evenly across the tower packing?

92. Have the following been removed or minimised as far as possible:-

• Dead-legs/stop ends? **Y**  
☐ **N**  
☐

• Redundant pipe work? **Y**  
☐ **N**  
☐

• Redundant plant or equipment? **Y**  
☐ **N**  
☐

	<b>Y</b>	<b>N</b>
93. Are any parts of the tower capable of becoming wet, accessible and/or removable for cleaning?	<input type="checkbox"/>	<input type="checkbox"/>

## Section 5- Operation and maintenance

94. Is the system in regular operation (if no, see Q34 & 35)?	<input type="checkbox"/>	<input type="checkbox"/>
---	--------------------------	--------------------------

95. Are there procedures in place to operate standby equipment on a rotational basis?	<input type="checkbox"/>	<input type="checkbox"/>
---	--------------------------	--------------------------

96. Is there a comprehensive operating manual for the cooling system?	<input type="checkbox"/>	<input type="checkbox"/>
---	--------------------------	--------------------------

97. If the tower is operated intermittently or is required at short notice, is it run at least once per week, to ensure appropriate dispersal of water treatment chemicals to all parts of the system?	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------

98. If the tower is likely to be out of action for longer than a week, do procedures exist to re-commission it safely?	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------

## Section 6 - Water treatment programme

99. Is there a water treatment regime in place?	<input type="checkbox"/>	<input type="checkbox"/>
---	--------------------------	--------------------------

100. Are chemicals/biocides used to control:	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------

• Scale?	<input type="checkbox"/>	<input type="checkbox"/>
----------	--------------------------	--------------------------

• Corrosion?	<input type="checkbox"/>	<input type="checkbox"/>
--------------	--------------------------	--------------------------

• Fouling?	<input type="checkbox"/>	<input type="checkbox"/>
------------	--------------------------	--------------------------

- |                             |                                      |                                      |
|-----------------------------|--------------------------------------|--------------------------------------|
| • Microbiological activity? | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
|-----------------------------|--------------------------------------|--------------------------------------|

If the answer to any of the above is no – please list the alternative methods used below.

- |   |                                      |                                      |
|---|--------------------------------------|--------------------------------------|
| 101.If non-oxidising biocides are used, are two used on an alternating basis? | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
|---|--------------------------------------|--------------------------------------|

- |  |                                      |                                      |
|--|--------------------------------------|--------------------------------------|
| 102.Are chemicals dosed automatically? | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
|--|--------------------------------------|--------------------------------------|

- |   |                                      |                                      |
|---|--------------------------------------|--------------------------------------|
| 103.If the answer to Q39 is yes, are dosing pumps calibrated regularly? | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
|---|--------------------------------------|--------------------------------------|

### Section 7 - Monitoring

- |   |                                      |                                      |
|---|--------------------------------------|--------------------------------------|
| 104.Are daily checks undertaken to ensure that the system is operating within the parameters described in the operating manual? | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
|---|--------------------------------------|--------------------------------------|

- |   |                                      |                                      |
|---|--------------------------------------|--------------------------------------|
| 105.Are daily visual checks of water cleanliness performed? | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
|---|--------------------------------------|--------------------------------------|

- |   |                                      |                                      |
|---|--------------------------------------|--------------------------------------|
| 106.Is the physical condition of the whole system checked at least once per week? | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
|---|--------------------------------------|--------------------------------------|

- |  |                                      |                                      |
|--|--------------------------------------|--------------------------------------|
| 107.Is the composition of the cooling and make-up water monitored on a regular basis (see appendix 1 for details)? | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
|--|--------------------------------------|--------------------------------------|

- |  |                                      |                                      |
|--|--------------------------------------|--------------------------------------|
| 108.Are safe operating limits, for each parameter being measured/monitored defined and recorded in the operating manual? | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
|--|--------------------------------------|--------------------------------------|

- |   |                                      |                                      |
|---|--------------------------------------|--------------------------------------|
| 109.Are corrective actions for all “out of limit” circumstances, detailed in the operations manual? | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
|---|--------------------------------------|--------------------------------------|

110. Are all test results and checks recorded together with details of any remedial actions taken (this should include identification of the people involved).

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

111. Are dip slides tests performed at least once per week?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

112. Are slides incubated in a proper incubator (at 30°C for 48 hours)?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

113. Are samples for legionella taken at least quarterly (see appendix 2 for action levels)?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

114. Have any circumstances where more frequent testing may be appropriate been identified and recorded in the risk assessment?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

115. Are all results examined on a regular basis to identify and investigate any trends?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

#### Section 8 - Cleaning & Disinfection

116. Do the written procedures for the system include regular cleaning & disinfection?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

117. Is this undertaken at least every 6 months (if the answer is no - see question 57)?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

118. Does the cleaning & disinfection procedures include:-

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

- Initial concentration of oxidising biocide in use for the pre- and post-cleaning disinfection stages?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

- Contact time for each disinfection stage?

<b>Y</b>	<b>N</b>
<input type="checkbox"/>	<input type="checkbox"/>

- |  |                                      |                                      |
|--|--------------------------------------|--------------------------------------|
| <ul style="list-style-type: none"> <li>• Methods for carrying out cleaning, including the removal of packing?</li> </ul>   | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| <p>119.If packing materials cannot be removed, are there alternative methods of making sure they remain clean?<br/>List methods below</p> <div style="border: 1px solid black; height: 40px; margin-top: 10px;"></div>                 | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| <p>120.If the system is not shutdown every six months, list reasons and alternative measures available to ensure the cleanliness of the system below.</p> <div style="border: 1px solid black; height: 40px; margin-top: 10px;"></div> | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| <p>121.Are measures taken to protect any person involved in the cleaning &amp; disinfection of the system? – list these below</p>  |                                      |                                      |
| <p>122.Have plans been drawn up which investigate the potentially affected areas should an outbreak of infection occur and specify appropriate communications with local authorities?</p>  | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| <p>123.Are these plans fully explained in the system-operating manual?</p>   | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| <p>124.Are all emergency contacts and external communication routes identified and recorded in the operating manual?</p>   | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| <p>125.Do these plans specify plant or system shutdown “trigger” events e.g. high monitoring results etc.</p>  | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |
| <p>126.Do these plans consider precautionary system shutdown in the event of a legionella outbreak, which although in the local area, may not be associated with your facility?</p>  | <b>Y</b><br><input type="checkbox"/> | <b>N</b><br><input type="checkbox"/> |

*Actions arising*

A simple proforma that can be used to record and track actions arising is appended.

## Appendix 1

**Typical on-site monitoring checks recommended for good operating practice**

<b>Timing</b>		
<b>Parameter</b>	<b>Make-up Water</b>	<b>Cooling Water</b>
Calcium Hardness as mg/l CaCO <sub>3</sub>	Monthly	Monthly
Magnesium hardness as mg/l CaCO <sub>3</sub>	Monthly	Monthly
Total Hardness as mg/l CaCO <sub>3</sub>	Monthly	Monthly
Total alkalinity as mg/l CaCO <sub>3</sub>	Quarterly	Quarterly
Chloride as mg/l Cl	Monthly	Monthly
Sulphate as mg/l SO <sub>4</sub>	Quarterly	Quarterly
Conductivity µs (total dissolved solids)	Monthly	Weekly
Suspended solids mg/l	Quarterly	Quarterly
Inhibitor(s) mg/l	-	Monthly
Oxidising biocide mg/l	-	Weekly
Temperature °C	-	Quarterly
pH	Quarterly	Weekly
Soluble iron as mg/l Fe	Quarterly	Quarterly
Total iron as mg/l Fe	Quarterly	Quarterly
Concentration factor	-	Monthly

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Microbiological factor	Quarterly	Weekly
Legionella	-	Quarterly

(Source: Legionnaires disease: The control of legionella bacteria in water systems. Approved Code of Practice and Guidance. Health and Safety Executive, L8, 2000. [HSE Books](#), ISBN 0 7176 1772 6)

## Appendix 2

**Action levels following microbial monitoring for cooling towers**

<b>AEROBIC COUNT cfu/ml at 30°C (minimum 48 hours incubation)</b>	<b>Legionella bacteria cfu/l</b>	<b>ACTION REQUIRED</b>
10 000 or less	100 or less	<b>System under control</b>
More than 10 000 and up to 100 000	More than 100 and up to 1000	<b>Review programme operation</b> – A review of the control measures and risk assessment should be carried out to identify any remedial actions and the count should be confirmed by immediate resampling.
More than 100 000	More than 1000	<b>Implement corrective action</b> – The system should immediately be re-sampled. It should then be ‘shot dosed’ with an appropriate biocide, as a precaution. The risk assessment and control measures should be reviewed to identify remedial actions.

(Source: Legionnaires disease: The control of legionella bacteria in water systems. Approved Code of Practice and Guidance. Health and Safety Executive, L8, 2000. [HSE Books](#), ISBN 0 7176 1772 6)

**Appendix 3 - Action Register**

*All actions identified should be entered into this Form, together with a target date and details of the person to whom the action has been assigned. This form should be reviewed regularly to ensure that all actions are completed. Target dates should not be allowed to pass without comment or re-scheduling.*

**Location:**.....

Action Item	By Date	By Whom	Completed	Comments

**Name of Auditor:**..... **Signature:**..... **Date:**.....

**Actions Approved by:**..... **Date:**.....

---

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## Revision Log

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02/10/2008	Almaz Agazade	Hijran Jafarova	Initial issue
20 May 2009	Almaz Agazade	Eldar Yarmamedov	Revised