Health and Safety Executive
and Local Authorities

Inspection topic pack to deliver Legionella Intervention Programme 2012 – 2014:

Controlling the risks from Legionella in cooling towers and evaporative condensers

Version 4

April 2013

CONTENTS

1. BACKGROUND AND PURPOSE OF TARGETED INTERVENTION FOR THE CONTROL OF LEGIONELLA RISKS IN THE WORKPLACE

1.1 A revised programme of interventions to promote the control of legionella risks has been developed. This follows a review of (a) Legionnaires' disease outbreaks over the past 10 years and (b) HSE's formal enforcement action on legionella risk control over the past 5 years[1]. The main findings from these reviews are confirmed by the lessons emerging from the 2012 Edinburgh and Stoke outbreaks. The programme, in its entirety, will cover the range of legionella risk systems and involve stakeholder engagement, education, advice, the publication of safety notices and follow-up targeted compliance checks. The type of intervention(s) undertaken for different systems will be dictated by the level of risk associated with the system. Evaporative cooling systems (cooling towers and evaporative condensers) have been identified as posing the greatest risks using the following risk criteria:

- Numbers and scale of outbreaks arising from the system
- Levels of compliance associated with the system/sector
- Complexity of the systems involved

1.2 Evaporative cooling systems operate at optimum temperatures for the growth of legionella bacteria. They are re-circulating water systems that can allow the bacteria to build up within the system and generate large quantities of aerosol that, if uncontrolled and dispersed, can spread into the wider environment, potentially affecting the general public. Such systems are often associated with a large number of exposures during individual outbreaks, and can be described as low frequency/high impact occurrences. It is estimated that there are around 5000 such potential sources.

1.3 Due to higher risk nature of these types of systems, the use of the entire spectrum of interventions, including inspection (to check compliance with relevant legislation, following publication of safety notices[2]), is considered appropriate. The purpose of this topic pack is to provide guidance to inspectors carrying out inspections at sites where these systems operate.

[1] http://www.hse.gov.uk/research/hsl_pdf/2012/hex1207.pdf?eban=rss-legionnaires-disease

[2] http://www.hse.gov.uk/safetybulletins/coolingtowers.htm; http://www.hse.gov.uk/safetybulletins/legionella2.htm

2. TIMING AND RESOURCES

2.1 Inspections of evaporative cooling systems as part of this programme will be undertaken during the latter part of 2012-13 and during 2013-14.

2.2 There are around 5000 sites prioritised for inspection of which, roughly 55 – 60 % are HSE-enforced. It is envisaged that inspectors will spend around half a day on site and up to another half day in preparation / follow up time. Where very complex and diverse systems are present, or where significant enforcement action is required, time spent is likely to be higher. Thus around 5500 inspector days are estimated across HSE and LAs, plus administrative resource within HSE to verify and distribute inspection lists, set up service orders etc.

3. TARGETING AND PRIORITISATION

3.1 HSE has designed a questionnaire (Appendix 1) that will be sent to all operators of evaporative cooling systems. HSL will send out the questionnaire, receive and analyse replies. The purpose of the questionnaire is to broadly prioritise sites for inspections. It is not intended to provide comprehensive information on performance or risk.

3.2 Some questions include very basic aspects of control (such as whether a risk assessment exists). These are 'key' questions and are marked as pass or fail. The remaining questions are scored, with lower scores indicating better performance.

3.3 The following factors (in the order below) have been used to determine priority order for inspection within each area:

- Sites from which no completed questionnaire is received
- Sites that have failed any of the key questions
- Sites with higher scores for the remaining questions
- Sites with lower scores, but with higher population densities within 2km.
- Remaining sites

3.4 A list of sites in prioritised order will be provided to each HSE office and LA as an excel spreadsheet. The sheet will also contain information to assist with the inspection (such as a summary of questionnaire responses, population density, address, COIN number if on HSE's system).

3.5 It is intended that all sites will be inspected during the programme, with the above factors used to determine the appropriate order and timing of visits.

3.6 Local factors may render inspection inappropriate or justify a timing other than indicated by the given priority. Reasons should be recorded in the comment box included on the spreadsheet (for HSE) and on the recording database for LAs. Examples of relevant local factors include:

- Cooling system decommissioned

- The site was recently visited (2011/12, 2012/13 work years) and the inspector gained sufficient assurance that the duty holder is able to achieve sustained control of legionella]
- There is an existing intervention plan / initiative that means timing of the visit is affected by other factors

3.7 If HSE or LA Inspectors identify that any site information is incorrect, they should alert the DIO or LAU via helaextranetenquiries@hse.gsi.gov.uk respectively, so that the spreadsheets can be corrected.

3.8 Inspections will be undertaken by suitably trained, competent HSE[3] and Local Authority (LA) inspectors at those sites where they are the relevant enforcing authority. A briefing session will be provided for all HSE inspectors involved in the programme. LA inspectors will be invited to attend these sessions.

3.9 If inspectors identify any other sites with cooing towers that are not on the list, they should inform the DIO or LAU as above, so that the site can be contacted and added to the list if appropriate. Inspectors should not inspect such sites unannounced (unless there are visible matters of evident concern).

4. INSPECTION ARRANGEMENTS AND SUPPORT MATERIAL

4.1In addition to prioritised listings referred to above, HSE teams and each LA will receive completed questionnaires and address / contact details of premises within their areas. Within FOD, local administrative teams will set up a service order to record the inspection outcomes. In HID CI, this will be carried out centrally by CI4E and in HID SI by SI4. LAU will arrange for LA site listings to be made available on a bespoke database on the extranet to enable LA to report back on inspection outcomes. The site known as LePID can be accessed by designated local contacts via https://ourknowledge.hse.gov.uk/Legionella_Database/default.aspx. Note this is an internal reference for LA inspectors only.

4.2 Support material and guidance are provided in this document and appendices, to facilitate the inspection process. If specialist support is required, HSE inspectors should contact the Occupational Hygiene inspectors in their FOD Specialist Groups in the first instance. LA inspectors should use their usual mechanism for obtaining specialist support; via the ELO for their area in England and Wales and through Jamie Campbell (Partnership Officer) in Scotland.

4.3 A template for an optional pre-visit letter is included at Appendix 3. Use is not mandatory if telephone arrangements will suffice. However, we recommend that you make clear to dutyholders what information we will

[3] According to the requirements of the Health and Safety Supplement for legionella

need to see (see Appendix 3) and that we expect someone to be available who can signpost us to the relevant parts of any large documents.

5. INSPECTION GUIDELINES

5.1 Further information on inspection of legionella is given in the Operational Guidance (OG) that accompanies this document (as Appendix 2)[4]. Inspectors are NOT expected to physically inspect all cooling towers / condensers on site, but to use their judgement about the number that will provide a representative sample to test out what is included in the documentation provided by dutyholders (such as risk assessments, written scheme of control etc) and which towers may provide the most indicative sample. Inspectors should use exactly the same approach to sample and drill down on topics as for any other inspection.

5.2The following topics must be covered at the inspection:

- risk assessment
- written control scheme
- implementation of control scheme
- record keeping

5.3 The purpose of the inspections is to determine the level of compliance with relevant legislation (HSWA, MHSWR, COSHH and the practical advice in the Approved Code of Practice for the control of legionella bacteria in water systems, L8[5]). The safety bulletin issued in July 2012 on cooling towers is included within this pack Appendix 4) as dutyholders should be aware of the requirements included within.

5.4 Table 1 gives a set of generic performance descriptors and associated scores that are aligned to HSE's Enforcement Management Model (EMM), and specify an "Initial Enforcement Expectation" for each score. Note: the final enforcement action will depend upon consideration of the relevant dutyholder and strategic factors. Information on application of the EMM is provided in the OG.

5.5 Indicators of compliance are provided for each topic, within the OG. These should be used to assess compliance for each topic. For each of the 4 topics above, inspectors should compare the standards in place against the topic specific indicators and decide which score in Table 1 best describes the performance. That score should then be assigned to the topic in question.

5.6 For HSE sites where FFI applies, a score of 10 would indicate that there is no material breach that requires written notice of contravention.

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[4] OG: Control of legionella: Inspection of evaporative cooling systems and investigation of outbreaks of Legionnaires' disease

[5] Note: due to ongoing legal discussions regarding L8, this should be considered as an established standard for the purposes of these inspections

5.7 If inspectors encounter matters of evident concern during the visit, then they should be pursued in the normal way (http://www.hse.gov.uk/foi/internalops/ocs/001-099/18_12.htm)'.

6. INSPECTION RECORDING

6.1 HSE inspectors: A COIN service order will be set up (by local administrative teams or centrally within HID – see section 4.1) to record inspections and a rating line is provided for each of the topics above, where scores should be recorded. When notices are served or criminal proceedings are initiated, enforcement cases should be set up and linked in the normal way.

6.2 For scores of 20, 30, 40, reasons should be included on the COIN record, and the usual directorate procedures followed regarding letters, issues and notices.

6.3 Within HSE, service orders will be set up for all sites on the list provided. Where a visit is not made (based upon the factors listed in paragraph 3.6) then a note should be made on the service order, which should then be closed. LA inspectors should include reasons for non-visits (paragraph 3.6) within the appropriate field on LePID.

6.4 LA inspectors are asked to enter details on the LePID database via their designated local contact. The database has been developed to capture data for the pre-populated fields to enable evaluation and summary reporting for the programme. Further details are contained in Appendix 5.
Note. Where LA letters give advice, as opposed to letters requiring action, these should not incur a score of 20. Only where there is a breach of legislation, with associated EMM risk gap, should a score of 20+ be assigned (and the appropriate enforcement action taken). Enforcement letters are those that require specific improvements, linked to legislation and within set timescales.

7 ENFORCEMENT

7.1 The score assigned for each topic is linked to an initial enforcement expectation. In line with HSE's Enforcement Policy Statement (http://www.hse.gov.uk/pubns/hse41.pdf), HSE inspectors should use the Enforcement Management Model (EMM) (http://www.hse.gov.uk/enforce/emm.pdf) when considering enforcement decisions during inspections. More advice is provided in the OG, along with sample notices.

Whilst use of the EMM is not compulsory for LAs, it is recommended.

8. GENERAL ADVICE

8.1 HSE Inspectors should also read and be aware of the requirements of HSE's Health and Safety policy regarding Legionella: Legionellosis - dealing with the risk of exposure (appendix 6)
Local authority inspectors should refer to their own authority's health and safety policy.

9. HSE CONTACTS

HSE inspectors should direct questions about the programme to Paul McDermott HID SI4 0151 951 3405 (523 3405)

LA inspectors should contact the relevant ELO or LAU via helaextranetenquiries@hse.gsi.gov.uk or Jamie Campbell (Scotland).

LePID database: email queries should also be sent via helaextranetenquiries@hse.gsi.gov.uk

Table 1 Legionella compliance descriptors

Rating Evidence observed against the indicators of compliance for each topic should be assessed against the following descriptors.			
40	**30**	**20**	**10**
Improvement / Prohibition Notice / consider prosecution	**Improvement Notice**	**Letter / Notice of contravention**	**Fully compliant or verbal advice only**
• Unacceptably far below relevant minimum legal requirements. • Several compliance indicators are not met. • Degree of non-compliance extreme and / or widespread. • Failure to recognise issues, their significance, and to demonstrate adequate commitment to take remedial action.	• Significantly below the relevant minimum legal requirements. • Several compliance indicators are not fully met. • Degree of non-compliance significant. • Limited recognition of the essential relevant components of effective health and safety management, but demonstrate commitment to take remedial action.	• Meets most of the relevant minimum legal requirements. • Most compliance indicators are fully met. • Degree of non-compliance is significant • Management recognise essential relevant components of effective health and safety management, and commitment to improve standards.	• Meets all or most of the relevant minimal legal requirements • All or most of compliance indicators are met. • Degree of non-compliance is minor • Management competent and able to demonstrate adequate identification of the principal risks, implementation of the necessary control measures, and if necessary demonstrate commitment to make improvements
Risk gap: EXTREME • Initial enforcement expectation*: Enforcement Notice and/or Prosecution.	**Risk gap: substantial** • Initial enforcement expectation*: Improvement Notice	**Risk Gap: moderate** • Initial enforcement expectation: enforcement letter	**Risk Gap: none / nominal** • No action necessary or verbal advice (local authority inspectors may issue letter giving advice on best practice or minor issues)
* Actual enforcement conclusion dependent upon Dutyholder and Strategic Factors as per HSE's Enforcement Management Model.			

APPENDIX 1: Targeting questionnaire and letter

(Completed Questionnaire for specific dutyholder will be provided to inspectors as a hard copy)

Letter to accompany questionnaire

The duty holder for health and safety matters
Address 1
Address 2
Address 3
Address 4

Unique identification number:

Date

Management of the risks from legionella in cooling towers and evaporative condensers: Survey of commercial and industrial premises

Dear duty holder

The Health and Safety Executive (HSE) has carried out a review of outbreaks of Legionnaire's Disease in Great Britain over the past ten years. This has shown there continue to be outbreaks of this potentially fatal disease as a result of poor control of industrial water systems such as cooling towers and evaporative condensers.

In response to this information, HSE and Local Authorities are undertaking a targeted programme of interventions. This will include: stakeholder engagement, education and advice, the publication of safety notices and follow-up targeted compliance checks.

To help us target interventions effectively, we request that you provide us with information about the cooling towers and evaporative condensers at this site by completing a questionnaire. The answers you give will provide information to enable us to plan our visits over the duration of the programme. Visits will be conducted by local HSE regulatory staff or Local Authority regulators depending on who is your usual enforcing authority for health and safety matters.

The questionnaire can be accessed online by typing the following web address into the address bar on your web browser:

https://www.hsl.gov.uk/surveys/coolers/coolers.htm

Please complete the questionnaire and submit it to us by 22nd XXXXXX 2013.

Given the importance of the issue, we will follow-up any non-returns of the questionnaire with the companies concerned including, if necessary, by visit. I hope you will agree this is an important programme and would like to thank you for your cooperation.

If you have any problems accessing or completing the questionnaire, please contact [name of HSL contact]. You may find it helpful to consult the "Legionnaires' Disease" pages of the HSE website when completing the questionnaire. From the home page, the "Legionnaires' Disease" pages can be accessed by clicking on the "more topics" link in the "I am interested in" box.

continued:

If you no longer have cooling towers or evaporative condensers at this site, please contact [name of hsl contact].

If you have any technical queries concerning the content of the questionnaire please contact [name of HSE contact]
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Yours faithfully

Dr Joanne Nettleton
Head of Biological Agents Unit

APPENDIX 2

Control of legionella: Inspection of evaporative cooling systems and investigation of outbreaks of Legionnaires' disease

Open Government status
Fully Open

Target audience
FOD Inspectors (Bands 0-4)
SG Specialist (Occupational Hygiene) Inspectors (Bands 0-3)
HID Inspectors (Bands 0-3)
BAU Inspectors (Bands 0-3)
LA Health and Safety Enforcement Officers

Contents (CDS1 Online to make a hyperlinked list here please)
Summary

This document provides guidance on inspection, investigation and enforcement on legionella risk from evaporative cooling systems.

It also describes HSE's role in outbreaks of Legionnaires' disease.

Introduction

This Operational Guidance updates and replaces Operational Circulars OC255/9. OC255/12 and LAC 46/1.

Legionnaires' disease can be acquired occupationally but it can also be a major public health issue. This guidance sets out the key requirements for managing evaporative cooling systems in order to control the growth and spread of legionella bacteria. It will assist inspectors in deciding whether the measures in place are adequate to control the bacteria and provide guidance on enforcement action where controls are inadequate. It is aimed primarily at evaporative cooling systems but may be applicable to legionella risks from other systems.]

The guidance also sets out HSE's role in the investigation of outbreaks and provides a guide to determine whether the investigation of single cases of Legionnaires' disease is appropriate.

Action
Inspectors should use this guide when:

- undertaking inspections (**Appendix 1**)
- investigating outbreaks related to cooling towers and evaporative condensers (**Appendix 2**)
- considering investigation of single cases of Legionnaires' disease (**Appendix 2**)

- inspecting or investigating legionella risks in hot and cold water systems
  (Appendix 3 - to be added later)
- considering enforcement action (**Appendix 4).**

Background

Legionnaires' disease is a pneumonia - like illness caused by inhaling an aerosol containing legionella bacteria. It can be fatal in susceptible individuals. Legionella bacteria may also cause Pontiac and Lochgoilhead fevers which are similar, but generally milder, illnesses that are not fatal [**NOTE:** legionellosis is the name for the group of diseases caused by the legionella bacteria].

Legionella bacteria are aquatic organisms commonly found in natural water sources such as rivers, lakes and reservoirs. They are generally present in low concentrations in such situations and do not give rise to illness. Outbreaks of illness can occur when the bacteria colonise water systems, proliferate and are spread by aerosol generation. Any water system may become colonised including hot and cold water systems, spa pools and industrial sources using process water. Evaporative cooling systems have been linked to higher numbers of Legionnaires' disease cases than other types of water system (HSL report http://www.hse.gov.uk/research/hsl_pdf/2012/hex1207.pdf?eban=rss-legionnaires-disease

Evaporative cooling systems, such as cooling towers and evaporative condensers, are found in manufacturing processes which use evaporation to reduce the heat of process water. Such systems generally produce an aerosol when the water stream interfaces with airflow. Drift eliminators are normally fitted to reduce and prevent aerosol spread. They trap most, but not all, of the aerosol, a small proportion will always escape to atmosphere even where the drift eliminators are in good condition and well-fitted. Where the quality and cleanliness of cooling water is not satisfactorily maintained, it is possible for a contaminated aerosol to be dispersed over a wide area, potentially affecting members of the public. Certain factors contribute to the growth and spread of bacteria including

- stored and/or re-circulating water
- water temperature between 20–45 °C
- a source of nutrients for the organism e.g. presence of sludge, scale or fouling
- aerosol created by a cooling tower, or water outlets

In favourable conditions the bacteria may grow rapidly. The growth and spread of legionella bacteria in system water must therefore be effectively controlled by maintaining both plant and process water in a clean condition and reducing, so far as is reasonably practicable, the possibility of aerosol generation or spread. This requires regular cleaning and maintenance and, in most cases, the addition of a proprietary biocide. In some circumstances, other technologies may be used that do not rely on chemical treatment or

alternatives to wet cooling systems can be considered and the risk thus eliminated.

More information on legionella bacteria and conditions favouring growth is available on the HSE 'Legionella and Legionnaires' Disease web page at: http://www.hse.gov.uk/legionnaires/what-is.htm

Health and safety of HSE staff

HSE inspectors should not undertake any inspection of water systems or investigate an outbreak of Legionnaires' disease unless they

- have completed an appropriate training course
- are familiar with Legionnaires' Disease The control of legionella bacteria in water systems Approved Code of Practice (ACoP) (L8 Rev);
- are deemed competent; and
- have reminded themselves of the HSE health and safety requirements http://intranet/yourhealthsafety/health/legionellosis.htm

Inspectors must ensure that the installation is made non - operational before a physical examination takes place. In outbreak situations, if examination of a system is required quickly and it is not possible to make the installation non-operational for process reasons, inspectors should contact a specialist and ask for advice on how to proceed. In practice, this requires the duty holder to switch off the tower fan for a period of approximately 30 minutes prior to approaching the device in order that the system has time to equilibrate and for aerosols to disperse. [Note: see also page 8 physical examination]

[**NOTE:** LA enforcement officers should familiarize themselves with their authority's own health and safety policy]

Further information on investigation during a Legionnaires' disease outbreak in contained in Appendix 2.

Further References

Legionnaires' Disease The control of legionella bacteria in water systems Approved Code of Practice (ACoP) and Guidance
http://www.hse.gov.uk/pubns/books/l8.htm

Safety Notices 1 and 2
http://www.hse.gov.uk/safetybulletins/coolingtowers.htm and
http://www.hse.gov.uk/safetybulletins/legionella2.htm

Contacts

Specialist Occupational Hygiene Inspectors (SG) should be contacted for operational support when:

- it is not possible for process reasons to have the required part of the installation switched off for a physical inspection; or

- it is necessary to investigate technical aspects beyond the scope of this guidance.

Appendices

Appendix 1 - Inspection Guidelines

Appendix 2 – Investigation of outbreaks of legionellosis from evaporative cooling systems.
Appendix 3 – hot and cold water systems to be added later

Appendix 4 Enforcement

Appendix 1: Inspection of evaporative cooling systems and other industrial and commercial water systems.

Inspection

The inspection procedure is set out in operational guidance http://www.hse.gov.uk/foi/internalops/og/ogprocedures/inspection/index.htm This OG is additional guidance for inspection of premises with legionella risks. The inspection may be a planned inspection or may be a result of a matter of potential major concern (mpmc).

Inspection comprises two stages:

1. ***Review of the documentation including the***
    a) Notification of the evaporative cooling system
    b) Risk Assessment
    c) Written Scheme (including documentation of management arrangements)
    d) Monitoring Results (outcome of inspections and routine tests);

2. Physical examination of the
    a) Pack
    b) Pond
    c) Drift eliminators
    d) Other ancillary systems eg biocide dosing system

Review of Documentation

Inspectors are likely to be presented with a considerable wealth of paperwork and records going back over time. It is important that the review of this paperwork is approached in exactly the same way as any other issue would be approached ie by assessing the documentation overall then selecting an aspect and drilling down to enable judgement to be formed on compliance with standards eg L8 and benchmarks eg is the risk assessment suitable and

sufficient? Inspectors will also be looking to identify any deficiencies eg failure to act on reports requiring remedial action eg pack replacement, failure to review why there are repeated failures of control (even although remedial action has been taken), or failure to consider whether dipslide readings are commensurate with other readings and practices.

Notification

Inspectors should first check with the dutyholder that their installation(s) has been notified to the LA under the Notification of Cooling Towers and Evaporative Condensers Regulations (NCTEC) 1992. If there have been any changes to the installation/s since initial notification, then the changes should also have been notified, eg additions and decommissioning..

Risk Assessment

It is important that the assessment considers the risk of the system as a whole, including all pipework and associated plant including pumps, heat exchangers and water softeners.

Assessment should not be over-reliant on the water treatment programme. Whilst this is likely to be a vital component in controlling risk, inspectors should ensure that all aspects of the management regime are appropriately addressed.

The assessment should identify and evaluate potential sources of risk. It should detail the means to prevent or reduce those risks and how exposure is to be controlled. In making the assessment, the characteristics of the plant, its use and location all need to be taken into account. This includes:

- the normal operating characteristics of the plant e.g. operating temperatures, the type of plant, process and system, operation of any control equipment;
- any unusual, but reasonably foreseeable, operating conditions eg breakdowns
- the presence of deadlegs, dual pumps, infrequently used pipework or ancillary plant;
- the age and condition of the system eg old or wooden towers, damaged or corroded system hardware;
- the source and condition of incoming water source;
- the likelihood of environmental or process contamination;
- proximity to buildings housing susceptible groups of people;
- proximity of exhaust stream to other buildings.

The risk assessment should be carried out by a competent person and should document the management arrangements required to ensure that the controls are implemented and continue to be effective.

Written Scheme

ACOP L8 gives practical advice on a written scheme which documents the measures that have been chosen to address the identified risks and achieve the necessary control. The written scheme sets out how controls are to be implemented and the organisational arrangements to ensure these are, and remain, effective. It is likely to comprise (or signpost to) a variety of documentation, including plans/schematics, the water treatment programme, cleaning/disinfection procedures and inspection and monitoring regimes. It should clearly describe correct operation of the system to include shutdown procedures, operating cycles, maintenance frequencies and actions to deal with matters of concern e.g. breakdowns, abnormal/unexpected test results and/or unclean systems. The information should be well ordered and easy to follow to enable the dutyholder to check that the correct procedures are being followed and facilitate monitoring and review.

Monitoring results

Monitoring includes all checks on the effectiveness of the written scheme and should not be restricted to the results of chemical and microbiological testing. Regular chemical monitoring provides information about biocide concentrations, the amount of solids suspended in the water and the degree to which scale and corrosion are being controlled.
Measurements of microbiological activity (dipslides or total viable counts (TVCs)) are used to indicate the overall bio-burden within the water and the effectiveness of the chemical treatment programme. Interpretation of microbiological results is not straightforward. It is more important to consider the trend of the results, as isolated sample results will be of little value when assessing the overall condition of the system.

Routine visual inspection of plant is often neglected or undertaken ineffectively. An effective visual inspection programme is key to identifying physical conditions favouring microbial growth or aid uncontrolled dispersion of aerosol. Records should provide evidence that the dutyholder is undertaking regular visual inspections, noting the condition of the pack, drift eliminators and pond water. Where deficiencies are found, the records should show what remedial action was taken and when.

Physical examination

Physical examination is an important component of an effective inspection. For inspection purposes, the fan should be turned off for 30 minutes before approaching the installation. Physical inspection **should not** be attempted where the installation cannot be switched off. Check for air inlets and openable windows in close proximity to the tower exhaust air stream, where any aerosol drift could be drawn in. The risk assessment should recognise these matters and the controls and monitoring levels should reflect the situation accordingly.

For crossflow towers where the existing documentation indicates that risk is being adequately controlled, only the fan needs to be turned off. For

counterflow towers, the airflow moves vertically upwards through the packing, making it difficult to observe the packing without getting wet, and therefore it may be necessary to switch the circulation pump off as well.

Usually, switching off the fan should not cause problems for the dutyholder but if this is the case, a revisit may be necessary when the tower is not in use or during a scheduled shutdown period. However, switching both fan and pump off can be problematic for operators in some instances. If pumps continue to circulate system water, at least some cooling can be maintained (which may be critical in some cases) and the absence of the airstream means that production of fine, breathable, droplets is greatly reduced. A scheduled revisit may be necessary.

In an outbreak situation, the expectation is that the device will be voluntarily shutdown for the purposes of inspection, unless shutdown presents a greater safety risk.

Inspectors should check that safe access is available for plant situated at height to facilitate inspection given that drift eliminators are often sited on top of the device. (see internal guidance http://intranet/yourhealthsafety/visiting-staff/visiting.htm for further information on general precautions NB HSE only). If there are problems with gaining safe access to the installation, then enforcement action should be considered. (If access is difficult for inspection then it will also present difficulties for examination and maintenance by the dutyholder, indicating that it is not effectively carried out.)

Removable hatches or viewing panels may be utilised to allow internal components to be viewed, but no attempt should be made to dismantle any part of the installation.

The components to be inspected will include;

- *Pack -* ***(Note these are not present in evaporative condensers). Look for scale build - up on surfaces, silt deposits, algal growth. When inspecting crossflow towers (where the fan only has been switched off), uneven water flow may be an indicator of scale build-up within the structure.***

- **Pond -** These should be screened to reduce windage, minimise solar heat gain and prevent ingress of organic matter or debris. Look at the condition of the sump water for the presence of microbial growth or cloudiness from dissolved salts and biofilm.

- **Drift Eliminators -** Check to see that these are well fitted and free from damage. Extensive localised wetting of surfaces close to the exhaust stream with evidence of algal growth and scale deposition indicates ineffective control of drift. (Note: drift eliminators can only *limit* rather than *eliminate* the amount of cooling water in the exhaust air stream). If possible, view from below to see if daylight is visible which indicates misalignment or physical damage.

- **Biocide Dosing -** Where there is automatic dosing equipment**,** check that the reservoir is not empty and that the dosing delivery tubing is connected and not split or otherwise damaged. The chemicals used can be checked and compared with the details provided in the written scheme. The sampling and dosing points can also be checked when on site.

Water Treatment Companies

Many dutyholders contract out activities in relation to the maintenance and control of risk from water systems to specialist water treatment companies (WTCs). Services provided range from risk assessment, water management, supply of chemicals, analytical services to cleaning/disinfection. It is important that the dutyholder maintains managerial responsibility for the installation(s) as their legal responsibility cannot be delegated. The written scheme should define roles and responsibilities, lines of communication and reporting arrangements.

Many WTCs are members of the Legionella Control Association (LCA) and are governed by their Code of Conduct http://www.conduct.org.uk/index.html.
However, the dutyholder must nevertheless make reasonable enquiries into the competence of any service provider contracted for the purposes of legionella control. The ACoP also places duties on suppliers of services, including WTCs, to ensure the competence of their staff and the efficacy of services provided to control or prevent the risk of exposure to legionella bacteria. Where deficiencies in such services are identified, appropriate enforcement action against the service provider should be considered.

Legislation

Duties under HSW extend to risks from legionella arising from work activities. Legionella bacteria come under the scope of Control of Substances Hazardous to Health Regulations 2002 (as amended) (COSHH). The Management of Health and Safety at Work Regulations 1999 (MHSWR) are also relevant to control of legionella bacteria and ACOP L8 Legionnaires' disease: the control of legionella bacteria provides the basic framework for dutyholders.

Occupiers have a duty under the Notification of Cooling Towers and Evaporative Condensers Regulations 1992 (NCTEC) to notify LAs of cooling towers and evaporative condensers on their premises except where they contain no water that is exposed to air, and/or their water or electricity supply is not connected. The main purpose of notification is to assist in identifying where such devices are located in the event of an outbreak of legionellosis.

Indicators of compliance

The following indicators (Table 1) are provided to illustrate what successful compliance should look like for each inspection topic. A judgement needs to be made on the overall picture of compliance in each area and accordingly, it is this that should determine the initial enforcement expectation.

1. Risk assessment

Requirement	Relevant legislation/guidance
Suitable and sufficient risk assessment and significant findings recorded (and written down if the site has five or more employees)	MHSW Regulation 3(1); COSHH Regulation 6(1)(a); L8 ACoP paragraph 23
Clear review date and arrangements to ensure review , both routine and in circumstances when there may be reason to suspect that the assessment is no longer valid e.g.: • changes to the operating parameters; • results of routine checks on control measures that indicate that the measures are no longer effective; or • possible cases of legionelloses associated with the system	MHSW Regulation 3(3); COSHH Regulation 6(3); L8 ACoP paragraph 27
Evidence that employees have contributed to, or have been consulted	COSHH ACoP paragraph 84; L8 guidance paragraph 36
Document is site- and system-specific, considers: • source of the supply cooling water (see record keeping); • periodicity of use of the cooling system; • potential sources of contamination (process and environmental) that could influence the risk of operation of the system; • unusual, but foreseeable operating conditions e.g., breakdowns.	L8 guidance paragraph 33
Considers all components of the evaporative cooling system including all associated pipework, pumps, feed tanks, valves, heat exchangers, as well as the tower itself	L8 guidance paragraph 21
Provides sufficient information for decisions to be made on measures to	COSHH Regulation 6(2); L8 guidance paragraph 28(b)

Requirement	Relevant legislation/guidance
prevent or adequately control the risks from exposure to legionella	
Note: there are a number of organisations that provide accreditation for activities related to control of legionella risk, including risk assessment. The United Kingdom Accreditation Service (UKAS) accredit companies in this field. Accreditation may provide some assurance that the risk assessment is suitable and sufficient but inspectors should not rely on this and should use their own knowledge and discretion to form an opinion on the adequacy of individual assessments	

2. Written scheme of control

Requirement	Relevant legislation/guidance
There is a scheme for controlling the risks from exposure to legionella that is consistent with the findings of the risk assessment	COSHH Regulation 7(3), Regulation 6(4)(b); L8 ACoP paragraph 53 requires the scheme to be written down and ACoP paragraph 66(c) requires the record of the scheme to be kept; MHSW Regulation 5(1), 5(2) requires arrangements to be written down where there are 5 or more employees
Contains an up to date description of the cooling system and a schematic diagram that covers: all cooling towers and/or evaporative condensers; all system control valves; all standby equipment, e.g., spare pumps; the location of system bleed valves; all associated storage tanks; all associated pipework; the location of chemical dosing points and/or injection points; the location of the system drain valve; the origin of the water supply; any parts that may be temporarily out of use	L8 ACoP paragraph 53(b)
Contains instructions for operating the system including safe start up and shut down procedures, including for safe start up for those in intermittent use e.g., routine circulation of treatment chemicals throughout the system or drain down, and arrangements to operate standby equipment on a rotational basis	L8 ACoP paragraph 53(b)
Contains details of precautions to be taken to control the risk of exposure to legionella, e.g., chemical dosing, cleaning and maintenance procedures	L8 ACoP paragraph 53(c)
Contains details of checks to ensure	COSHH Regulation 9(1)(b) and

that the cooling system continues to operate safely and efficacy of control measures: e.g., visual checks, water quality checks, monitoring biocide levels, monitoring microbiological activity, and instructions on the remedial actions to be taken if the scheme is shown not to be effective	9(2)(b); L8 ACoP paragraph, 53(d) and 9(e)
Arrangements include instructions for checking performance of the system and component parts, instructions for inspecting accessible parts of the system for damage and signs of contamination, monitoring activities to ensure that the control scheme remains effective	L8 guidance paragraph 61

3. Implementing the scheme of control

Requirement	Relevant legislation/guidance
Clear and up to date management structure for control of legionella risks	MHSW Regulation 5
A person has been appointed by the duty holder to take managerial responsibility for the implementation of the written scheme of control: 'responsible person'	L8 ACoP paragraph 39
The responsible person has an appointed deputy	L8 guidance paragraph 47
Contact details of the responsible person and the deputy are readily available in case of emergency	L8 guidance paragraph 47
Roles and responsibilities of external contractors engaged in legionella control activities are clearly defined in writing. Demarcation between contactor and operator, and roles within scheme of control are clearly defined. *Responsibility for ensuring that the control scheme is implemented remains with the responsible person*	L8 ACoP paragraph 41
Roles and responsibilities of all employees engaged in legionella control activities are clearly defined in writing	L8 guidance paragraphs 43, 46, 49 and 83
Arrangements to ensure that roles and responsibilities of those engaged in legionella control are reviewed regularly and whenever there is a change to the arrangements	L8 ACoP paragraph 42
All employees engaged in the scheme	MHSW Regulation 5 ACoP

Requirement	Relevant legislation/guidance
of control have received training tailored to suit the demands of the tasks required of them and training records are kept: (*Note: Accreditation of courses is provided by a number of organisations including the British Occupational Hygiene Society (BOHS), City and Guilds, the Water Management Society (WMS). Often, the site's water treatment company provides the training for staff – whilst this might not be accredited, it may be fit for purpose. Inspectors will need to assess on an individual basis*).	paragraph 34(c); L8 ACoP paragraph 40
Arrangements in place to ensure training needs of those with responsibilities for legionella control are assessed and reviewed regularly	MHSW Regulation 13 ACoP paragraph 80
Checks have been made on the competence of external contractors (including those that may have been involved in performing the risk assessment and in preparing the scheme of control).	. L8 ACoP paragraph 41

4. Record Keeping

Requirement	Relevant legislation/guidance
Record of the significant findings of the risk assessment for the operation of evaporative cooling plant	COSHH Regulation 6(4)(a) (applies where there are 5 or more employees); MHSW Regulation 3(6)(a); L8 ACoP paragraph 66(b)
Record of circumstances under which the risk assessment and the scheme of control should be reviewed.	L8 guidance paragraph 38
Records that identify the person or persons responsible for conducting the risk assessment, managing, and implementing the scheme of control. Include dates they were produced and arrangements in place to ensure they are retained for the period they remain current and at least two years after that	L8 ACoP paragraph 66(a) and 67
Records of any monitoring data, inspections and checks that have been undertaken (see below)	COSHH Regulation 9(4)
These records include the dates that they were produced and arrangements	MHSW Regulation 5 ACoP paragraph 37; L8 ACoP paragraph

Requirement	Relevant legislation/guidance
are in place to ensure that they are retained for at least five years	66(d) and 67
There are records of monitoring data that document: • by name and position, the people responsible for carrying out the various tasks under the written scheme • their responsibilities and lines of communication; • records of the schematic drawing of the system; • the precautionary measures that have been carried that include sufficient detail to show that they were carried out correctly (e.g., when dip slide tests are performed, the location of the testing point and the time that tests are undertaken are documented and signed by the person performing the operation - details of where and when to perform such tests are informed by the risk assessment and are included in the written scheme of control); • remedial work required and carried out on the system and the dates of completion; • a log of visits by contractors, consultants and other personnel; • cleaning and disinfection procedures together with reports and certificates (as well as the evidence used to determine the extent of cleaning required and to support the efficacy of the cleaning procedure, e.g., using photographic images); • results of chemical analysis of the water; • notification to the Local Authority of the intention to operate a cooling tower and/or an evaporative condenser; • up to date training records of personnel;	L8 guidance paragraph 69

Requirement	Relevant legislation/guidance
• details of the current state of operation of the system (e.g., when the system or plant is in use and, if not in use, whether it is drained down is recorded and; are signed or bear some other form of authentication	
Note on chemical analysis: these records should include the chemical analyses undertaken, such as measurements of pH, hardness, suspended solids which provide an indication of the propensity for the system to develop problems due to corrosion, build up of scale and fouling, respectively. Because iron promotes the growth of Legionella, levels of soluble iron in the system water should also be monitored. These tests require specialist knowledge and/or equipment and are usually conducted by water treatment companies and their findings should influence the water treatment regime in place. Routine tests such as those used to monitor levels of oxidising biocides circulating within the system are simple and are usually performed by appropriately trained on-site staff rather than water treatment specialists. Non-oxidising biocide levels in cooling water are difficult to measure, however, levels can be estimated on the basis use, i.e., quantities remaining in the dosing drum.	

Appendix 2:

Investigation of outbreaks of legionellosis from evaporative cooling systems.

Definition and scope of this guidance

This guidance relates to the investigation of outbreaks associated with evaporative cooling systems. It also provides guidance on when it might be appropriate to investigate single cases of disease

Background

Cases of legionellosis are primarily a public health issue and initiate investigation by the LA and the relevant NHS public health authorities. HSE is likely to be notified about single, as well as multiple, legionellosis cases, especially if there is a suspected link to HSE enforced premises.

On average, there are approximately 200-250 reported confirmed cases of Legionnaires' disease each year in England and Wales and it is thought that the total number of cases may be underestimated. About half of the cases are associated with travel abroad. Some clusters of cases and outbreaks occur for which no source of infection is confirmed. Legionnaires' disease is notifiable under public health legislation and registered medical practitioners have a duty to notify the relevant public health agency when they suspect a patient has contracted the disease. Legionnaires' disease is usually confirmed by a urinary antigen test.

Outbreak – definition and declaration

The Health Protection Agency (HPA) defines an outbreak (England and Wales) as two or more diagnosed cases linked by sufficient proximity in date of onset of symptoms, locality (place of residence, work or visited) and for which there is strong epidemiological evidence of a common source of infection, with or without definitive microbiological evidence. Health Protection Scotland (HPS) use the additional criteria of the cases occurring within a six-month period of the onset of illness from first case confirmed.

A judgement on which cases warrant further investigation is made by the Consultant in Communicable Disease Control (CCDC) in England and Wales, or by the Consultant in Public Health Medicine (CPHM) in Scotland. Declaring an outbreak will trigger the establishment of an Outbreak Control Team (OCT) [***NB: also referred to as Incident Management Team (IMT) or Incident Control Team (ICT); for ease of reference OCT will be used throughout this document].***

The Outbreak Control Team

The primary role of an OCT is to protect public health, and prevent further cases of disease. The aim will be to identify the source and control the risk as a matter of urgency.

The Chair of the OCT is usually an officer of the local authority or the NHS such as the Consultant in Communicable Disease Control (CCDC) in England and Wales and the Consultant in Public Health Medicine (CPHM) in Scotland. S/he would generally lead the investigation from the public health perspective.

Membership of the OCT is likely to include some or all of the following or their representatives:

- CCDC/CPHM and specialist staff from their team
- EHOs from the relevant LA(s)
- Consultant Microbiologist
- Representative(s) from HPA/HPS
- Clinicians
- NHS/LA Press/communications Officer

HSE can be invited to join the OCT and be directed to investigate all premises under its remit. HSE may also be asked to assist LAs, particularly with specialist support. HSE staff attending outbreak control meetings should normally be Band 2 or above with the necessary authority and experience to make strategic decisions, and advise members of the OCT on legal and technical matters. The input of an occupational hygiene specialist may be necessary at key meetings.

OCTs in England and Wales use a variety of local or regional incident protocols; Scotland has an agreed single national protocol http://www.documents.hps.scot.nhs.uk/about-hps/hpn/legionella-guidelines.pdf

The OCT will normally coordinate all the arrangements for the investigation of the outbreak including

- liaison cross-boundary and with other agencies;
- communication with the media, clinicians and other relevant personnel.

The OCT will meet as frequently as required and, ultimately, identify the end point of the outbreak, compile outbreak reports and identify lessons learned.

The outbreak investigation normally proceeds in two phases - a control phase, in which the objective is to minimise further cases and a second investigation phase. Where there are only a small number of installations within an outbreak zone, there may be a significant overlap between the two phases. In the investigation, HSE's objectives may differ from, but should not conflict with, those of the OCT.

Sampling – objectives and limitations

EHOs, acting under public health legislation, have powers to carry out sampling on all premises (including those that are HSE-enforced), usually in liaison with the relevant health protection body/laboratory, who may carry out the subsequent analysis. Depending on the findings on site, or the subsequent results of the analysis, dutyholders may be directed to carry out emergency cleaning and disinfection of their system, so called 'shot dosing' [NB *sometimes referred to as shock dosing]*

Sampling and analysis of system water can often fail to identify legionella for example

- by its very nature, sampling may fail to pick up bacteria in the system water if they are in low numbers and are embedded in biofilms on system surfaces
- bacteria may be missed due to the relatively small sample volumes taken (typically one litre or less) compared to system volumes which can be thousands of litres
- the bacteria may only have been present in the system transiently so sampling simply indicates no legionella was present when sampling took place; or
- sampling may have been carried out at an inappropriate point in the system eg downstream of a chemical dosing point.

In any event, the presence of legionella does not prove that an aerosol containing the bacteria was inhaled by anyone in the vicinity. Additionally, the sampling may not always be carried out at the most auspicious point in the system.

The judgement in the case R v Board of Trustees of Science Museum http://www.hse.gov.uk/foi/internalops/ocs/100-199/183_7.htm said that it was sufficient to prove that there was a risk of exposure and therefore potential for risk and no need to prove that there was actual harm. Since legionella is liable to be present in all water systems, a lack of control, suitable conditions for growth, or failure to prevent/minimise spread is sufficient to indicate a potential risk. Sampling is not considered necessary and, for reasons given in the preceding para, HSE's policy is not to carry out sampling.

Where the OCT requires microbiological analysis, HSE will be privy to this information. However any action taken by HSE must be in the context of the practical guidance in ACOP L8 and effective control. However, where analysis results are available which indicate that the dutyholder has failed to adequately control exposure, they can be utilised in any investigation and enforcement action, but not necessarily relied upon.

Inspectors should **not** take samples for the identification and quantification of legionella as HSE does not have the *vires* to sample on a public health remit. We have the vires to sample in HSE-enforced premises, but it is not our policy

to do so. If inspectors are requested to use their powers for legionella sampling, they should politely decline and explain HSE's position to the LA and the OCT.

Coordination

It will be necessary to ensure that any necessary action is coordinated between all agencies participating in outbreak investigations. Inspectors should take enforcement action where justified, after applying the EPS and the EMM. The views and action of the other agencies should be taken into account where appropriate. Inspectors should be satisfied that the relevant demarcation of responsibilities for investigation, enforcement and the provision of information has been agreed by the outbreak committee. Where other agencies take responsibility for communication with the media, inspectors must ensure that those agencies:

- are made aware of any statutory restrictions on disclosure of information; and
- do not disclose information about HSE-enforced premises without prior consultation.

HSE's role in outbreak investigation

Operational managers should consider a team response:

- nominating an inspector to lead the investigation on behalf of HSE;
- using operational support including VO assistance;
- identifying inspectors with the necessary training and competence;
- obtaining support from occupational hygiene specialist inspectors

Generally, the investigation should be led at Band 2 level. HID may also have premises for which they have enforcement responsibilities in the outbreak zone and the lead inspector should ensure that all relevant information is communicated to the local HID Band 2 inspector. The Head of Division, Regional News Network colleagues and HSE Press Office should also be kept informed. Press Office will take the lead on co-ordinating with the press offices of partner organisations.

The number of inspectors required will primarily depend on the number and range of HSE-enforced premises in the outbreak zone. Subsequent resource requirement will be determined by how quickly the number of potential sources can be narrowed down. Inspectors may need to be drawn from several groups, including HID groups, depending on the availability of suitably trained personnel and the premises to be visited.

HSE's Major Incident Response Plan may need to be invoked when for example:

- there is a major legionellosis outbreak;

- the scale of the outbreak requires more HSE resource than can be provided locally;
- a very large number of cases appears to be associated with one HSE-enforced site; or
- if the scale of local public and political concern is a major factor.

http://www.hse.gov.uk/foi/internalops/og/ogprocedures/majorincident/

The major incident investigation team would continue to work alongside the OCT

HSE's VOs may provide assistance in gathering intelligence eg
- obtaining lists of notified premises from LAs
- searching for suspect premises in the outbreak zone
- information to identify any non-notified installations.

The latter should focus on industrial processes and premises having a need to dissipate heat such as foundries, plastics manufacture, chemical and food manufacturing. In addition, processes involving freezing and chilling and/or use of water systems that store water and create aerosols should be identified.

Control phase

HSE inspectors should visit all HSE-enforced premises with notified installations within the outbreak zone to undertake a preliminary assessment. EHOs will undertake a parallel exercise in LA-enforced premises in addition to undertaking visits to all suspect premises in the outbreak zone and sampling under public health legislation. The inspection procedure should follow that for inspections described in Appendix 1.

Rapid assessment and decisions are likely to be required in order to limit the risk to public health. This may involve the use of both Prohibition Notices and powers under HSW s.20. EHOs visiting HSE-enforced premises for sampling purposes are likely to encourage dutyholders to disinfect and clean their systems when sampling is completed. Where possible, HSE and EHOs should co-ordinate their inspections in order that important evidence regarding the condition of the installation is not lost. Appendix 4 provides guidance on enforcement.

Investigation phase

During this phase, HSE's objective is to ensure that the risk of exposure posed by cooling plant is properly controlled, based on inspectors' assessment, following the practical advice in ACOP L8. In contrast, the OCT is concerned with identification of the source of the outbreak and protecting public health. HSE may appear less concerned with determining the source of the infection, and this difference in emphasis may be interpreted as lack of co-operation by OCT partners. Clarification of roles and responsibilities at an

early stage should avoid misunderstandings or unrealistic expectations from the outset.

Premises deemed to have posed a potential risk in the control phase may need to be re-visited and assessed in more detail during the investigation phase. Where the dutyholder engages a water treatment contractor (WTC), the WTC is likely to be present during the investigation and able to provide assistance on specific technical aspects of the installation, and the cleaning and maintenance regime.

Investigation of single cases of legionellosis

Individual cases of Legionnaires' disease, particularly affecting members of the public, are regularly notified to HSE with the expectation that we undertake or become involved in an investigation.

In the event of a fatal or non-fatal case of Legionnaires' disease to a member of the public, the Band 2 should follow the http://www.hse.gov.uk/enforce/hswact/priorities.htm

Once a decision has been made to carry out an investigation, the B2 should carefully define the scope and extent. For most situations, the workplace posing the most likely source of infection should be inspected with a view to examining all water systems that could present a risk and enquiries should not be restricted to evaporative cooling systems. Depending on the findings of the initial investigation, a decision may then be necessary as to whether to extend this to other premises in the vicinity. The decision to proceed should be based on careful judgement, balancing public concern against the risk of further infections. The latter will depend on factors such as the type of industries, the density of population and premises and the presence of susceptible groups of people.

As is the case with outbreaks, EHOs will be involved to deal with any potential public health risk. LAs requesting the assistance of HSE Occupational Hygiene Specialists should do so via the relevant Enforcement Liaison Officer (ELO) or partnership team.

Work-related death protocol

Where death results from a case or cases of suspected legionella exposure from a work activity, the police should take primacy in accordance with the Work-related Death Protocol: http://www.hse.gov.uk/pubns/wrdp1.pdf

Legislation

Occupiers have a duty under the Notification of Cooling Towers and Evaporative Condensers Regulations 1992 (NCTEC) to notify LAs of cooling towers and evaporative condensers on their premises, except where they contain no water that is exposed to air, and/or their water or electricity supply

is not connected. The main purpose of notification is to assist in identifying where such devices are located in the event of an outbreak of legionellosis.

The Environmental Protection Act 1990 (EPA) and Public Health etc (Scotland) Act 2008 allow LAs to make provision for matters pertaining to the protection of public health, including pathogenic organisms. This gives LAs the power to enter premises and take samples, irrespective of whether the premises are enforced by HSE or LAs under health and safety legislation.

Appendix 3:

Further guidance on hot and cold water systems to be added but meantime see link

http://www.hse.gov.uk/foi/internalops/sims/pub_serv/07-12-07/

Appendix 4 Enforcement

Enforcement action relating to identification and /or control of legionella risks should be informed by the Enforcement Policy Statement (EPS) http://www.hse.gov.uk/foi/internalops/ocs/100-199/130_6.htm and the Enforcement Management Model (EMM) http://www.hse.gov.uk/enforce/emm.pdf

In outbreak situations, there is almost certain to be pressure from the public and the media to locate the source, curtail further spread and prevent further cases of disease, and to be seen to be taking decisive action. Inspectors have no vires other than in HSE - enforced premises; LAs have additional powers under public health legislation.

Inspectors should consider all potential dutyholders including water treatment companies eg cleaning contractors and suppliers.

Please note: this OG is informed by OC130/5 which addresses all health risks to those at work. However, this guidance deals only with incidental exposure to legionella bacteria where both a working and non-working population may be affected.

Risk of serious injury (ill health)

If, in the inspector's opinion, there is evidence of a serious risk of infection by legionella bacteria from the installation, strong consideration should be given to serving an immediate or deferred Prohibition Notice (PN). This would be justified where there is evidence of legionella risk which is not controlled eg absence of a effective water treatment or/and cleaning/disinfection programme. In forming his or her

judgement the inspector may seek advice from a specialist inspector (occupational hygiene) or their Principal Inspector.

Whether a PN is served, or the dutyholder agrees to voluntarily switching off the installation, consideration should be given to (safely) gathering any evidence necessary before shock dosing takes place.

Determining the risk gap

a) actual risk

The measure of actual risk (where the dutyholder is) requires consideration of both the likelihood of the risk having effect and the consequences of the harm.

When considering the likelihood of risk from the system, this should only take account of the severity and extent of the control failings or omissions and the potential for these to provide conditions favouring growth of legionella in the water.

The design of wet cooling plant and the typical position at height means that failure of controls may lead to contaminated aerosol being dispersed over a wide area, exposing both employees and the general public. In urban areas, this may mean very large numbers of people. The likelihood (of actual risk) is **'probable'**. This does **not** require a judgement regarding the likelihood of disease occurring following exposure.

Legionellosis can result from inhalation of an aerosol contaminated by legionella bacteria. Some forms of the illness can be mild and others more serious. There is no certain way of predicting who, in a given community, will develop Legionnaires' disease. Some people are known to be more susceptible than others ie men, smokers, those with chronic respiratory conditions or compromised immunity. Effective treatment is available, but successful recovery depends on a number of variables, such as speed of diagnosis and the presence of underlying medical conditions. Overall, mortality rate is calculated at 10 – 15%, although this may rise significantly for immuno-compromised persons.

Therefore, when considering the potential likelihood and consequences of exposure to legionella bacteria (Table 1 EMM), the appropriate descriptor is '**serious'**. It is impossible to predict who might be affected and therefore the potential consequence is 'serious'. [NB para 55 EMM refers to health risk being determined by the likely response of the working population as a whole. In view of the potential widespread exposure of the general population, in this instance the consequence, for them, rather than the working population, is what determines the designation 'serious'.]

b) benchmarking

Effective management of the risk by following the guidance in L8 minimises the risk of microbial proliferation and the subsequent dispersion of contaminated aerosol. If effectively controlled the benchmark should be '**nil/negligible**'.

Legionella risks are considered to be a matter of major potential concern (mpmc) because of the potential to cause multiple fatalities or multiple cases of ill health http://www.hse.gov.uk/foi/internalops/ocs/001-099/18_12.htm.

Therefore, in most cases, Risk Table 2.2 should be used when determining the risk gap. In a small number of cases, use of Risk Table 2.1 may be more appropriate, for example, where cooling plant is positioned at ground level in remote locations.

Initial enforcement expectation

The key indicators set out in Table 1 (pages 10 -15 Appendix 1) are to assist inspectors in making their judgement as to overall compliance for each topic. The Table identifies a series of topics that dutyholders should properly address in order to demonstrate adequate control of legionella risks associated with evaporative cooling towers. Each topic is broken down into its constituent parts and guidance is provided on what a good standard of compliance should look like. The relevant legal provisions or guidance are listed alongside each section of guidance. These provisions/guidance are "Compliance Standards" in EMM terms.
Where the table indicates the issue is covered by a regulation the compliance standard is "Defined". Where it refers to guidance, the compliance standard is "Established".

The Table also refers to published document L8 which contains both guidance and material marked as ACoP. While compliance with both types of guidance will generally be sufficient to comply with the law, due to recent legislative changes both ACoP and guidance material contained in L8 should be regarded as "Established" standards.

In complex or unusual situations specialist advice may need to be sought from SG or HID SI4.

Non risk-based compliance and administrative arrangements

Some issues clearly fall under **compliance and administrative arrangements**, for example, retaining training records of personnel or notification of cooling plant to the LA. There is often a strong relationship between the control of risk and failure to address compliance issues. In cases where both risk and compliance issues exist, inspectors should decide on action principally in relation to the control of risk, and a risk gap approach is appropriate.

The following table illustrates application of the EMM to establish the Initial Enforcement Expectation for some common administrative shortcomings:

Issue	Relevant legislation/ guidance	Descriptor (EMM Table 5.2)	Compliance standard	Initial Enforcement Expectation
Failure to notify an installation in HSE-enforced premises	Reg 3 NCTEC Regulations	Absent	Defined	Improvement Notice
Inadequate risk assessment to identify any legionella risk;	Reg 3(1) MHSW; Reg 6(1)(a) COSHH	Inadequate	Defined	Improvement Notice
No risk assessment to identify any legionella risk;	Reg 3(1) MHSW; Reg 6(1)(a) COSHH	Absent	Defined	Improvement Notice
No written scheme to control the risk, but the dutyholder is able to demonstrate effective control	Regs 6(4)(b) & 7(3), COSHH Regs 5(1) & 5(2) MHSWR	Absent	Defined	Improvement Notice

Prosecution

It is not necessary to prove that an installation has been the source of infection or of an outbreak in order to successfully prosecute. It is sufficient to prove that the installation provided conditions that could give rise to the realisation of risk.

SAMPLE NOTICES

Inspectors should note: the following are sample notices and are no substitute for full and thorough analysis of the circumstances encountered (guided by the EMM) and tailored drafting to suit those circumstances. Further guidance is given in the Enforcement Guide (England & Wales) which also applies to Scotland in this respect:

http://ww.hse.gov.uk/enforce/enforcementguide/notices/notices-types.htm

1. To deal with risk of serious personal injury

The Health and Safety at Work Etc Act 1974, Sections 2 and 3

You have failed to ensure that your employees and persons not in your employment are not exposed to legionella bacteria, liable to result in fatal or debilitating disease.

The reason for my said opinion is:

You have failed to ensure that plant and equipment, including engineering controls, are maintained in an efficient state, efficient working order, in good repair and in a clean condition, in particular [name deficit here e.g. drift eliminators are broken and or missing] and thus prevent the exposure of your employees or persons not in your employment to aerosols containing legionella bacteria from [name CT or EC here].

OR

You have failed to ensure that the preventative and protective measures, to prevent or reduce exposure to legionella, are in place and effective, in particular, the [name deficit here – e.g. dosing equipment provided to deliver chlorination to the cooling water (name CT or EC here) is not operating effectively, such that high levels of legionella bacteria may be present within the system, and expose employees or persons not in your employment.

Note: these issues are examples only and inspectors will need to make a judgement on the deficiencies present at the time and whether they are liable to present a risk of serious personal injury. Specialist occupational hygiene inspectors will be able to assist in reaching a decision on whether they are is liable to be a risk of serious personal injury.

Note: You should add the means or requirement to ensure compliance with reduction in risk of serious personal injury e.g. a thorough disinfection and clean may be all that is required to reduce that risk. You should also consider which improvement notices will be required to secure long-term control.

2. Failure to notify a cooling tower/evaporative condenser to the Local Authority

Health and Safety at Work etc. Act 1974, Notification of Cooling Towers and Evaporative Condensers Regulations 1992, Regulation 3

You as the person in control of premises where a notifiable device, namely [insert name of CT or EC and details], is sited have not notified the local authority, in writing, of details of cooling plant under your control.

Note: It may be that the breach relates to changes to a notification in which case the detail may be 'information on changes to the number, type, of device etc. as is appropriate for the circumstances encountered' or 'information on intended/actual decommissioning, dismantling and removal from use'.

3. Failure to carry out risk assessment

Health and Safety at Work etc. Act 1974, Sections 2 and 3, Control of Substances Hazardous to Health Regulations 2002 (as amended) Regulation 6(1)

You have failed to carry out a suitable and sufficient assessment of the risks to health created by the operation of cooling plant [name and specific details of the CT or EC], under your control. In particular this pertains to the risk of proliferation and spread of legionella bacteria to employees and persons not in your employment.

SCHEDULE
In order to comply with this notice you should:

Carry out a suitable and sufficient assessment of the health risks to employees and persons not in your employment from exposure to legionella bacteria, a substance hazardous to health, from work activities and wet systems on the premises and identify any necessary precautionary measures.

The assessment should include identification and evaluation of potential sources of risk and:
(a) the particular means by which exposure to legionella bacteria is to be prevented; or
(b) if prevention is not reasonably practicable, the particular means by which the risk from exposure to legionella bacteria is to be controlled.

Where the assessment demonstrates that there is no reasonably foreseeable risk or that risks are insignificant and unlikely to increase, no further assessment or measures are necessary. Arrangements should be put in place for periodic review, and whenever circumstances affecting the risk change.

Note: Dutyholder also needs to record the significant findings and any group of employees identified as being especially at risk Regulation 3 (3)]

OR

Any other equally effective measures to remedy the said contravention may be taken

NOTE you may need to issue additional notice for competency and access to competent advice. See specimen notice number 4 below.

4. Failure to have effective health and safety arrangements

Health and Safety at Work etc Act 1974, Sections 2 and 3, Management of Health and Safety at Work Regulations 1999, Regulation 5.

You have failed to make and give effect to appropriate arrangements for the planning, organisation, control, monitoring and review of the preventive and protective measures required to prevent or, where this is not reasonably practical, reduce exposure to legionella bacteria.

Schedule

In order to comply with this notice you should:

1. Appoint a person (or persons) to take managerial responsibility for the control of legionella bacteria in your [insert water cooling tower or evaporative condensers] and provide supervision for the implementation of precautions.

AND

2. Ensure that this person (or persons) has the ability, experience, instruction, information and training, as well as the authority, status and resources to enable them to carry out their task completely and safely. In particular they should be familiar with:
(a) potential sources of legionella bacteria and the risks they present;
(b) measures to be adopted, including precautions to be taken for the protection of people concerned, and their significance; and
(c) measures to be taken to ensure that controls remain effective.

AND

3. Where the above expertise is not possessed by the person (or persons) appointed, help and support should be sought from outside the organisation. In such circumstances, the appointed person (or persons) should take all reasonable steps to ensure that:
(a) those carrying out work who are not under their direct control are competent; and
(b) responsibilities and lines of communication are properly established and clearly laid down

AND

4. Arrangements should be in place to ensure that the management and communication procedures are periodically reviewed as appropriate.

OR

Any other equally effective measures to remedy the said contravention may be taken

5. Failure to prevent or control the risks from exposure to legionella bacteria

Health and Safety at Work etc Act 1974, Sections 2 and 3, Control of Substances Hazardous to Health Regulations 2002 (as amended) Regulation 7.

You have failed to ensure that exposure of your employees and persons not in your employment to legionella bacteria, a substance hazardous to health, from [state CT/EC...] has been prevented or, where this is not reasonably practicable, adequately controlled.

Schedule

1 Where it is not reasonably practicable to prevent your employees and other persons who may be affected by the work carried out by you being exposed to legionella bacteria, a substance hazardous to health, you should ensure that you provide adequate controls to reduce exposure.

2 The controls to reduce exposure should be set out in a written scheme which includes the measures to be taken to ensure that it remains effective. The scheme should include:

a) an up-to-date plan showing layout of the plant or system including parts temporarily out of use;
b) a description of the correct and safe operation of the system;
c) the precautions to be taken;
d) the checks to be carried out to ensure the efficacy of the scheme and the frequency of such checks; and
e) the remedial action to be taken in the event that the scheme is shown not to be effective.

3 The protection measures should be appropriate to the activity and consistent with the risk assessment, including in order of priority:

a. the design and use of appropriate work processes, systems and engineering controls and the provision and use of suitable work equipment and materials;
b. the control of exposure at source, including adequate ventilation systems and appropriate organisational measures; and
c. where adequate control of exposure cannot be achieved by other means, the provision of suitable personal protective equipment in addition to the measures required by sub-paragraphs (a) and (b).
d. The measures should include the adoption of suitable maintenance procedures.

OR

Any other equally effective measures to remedy the said contravention may be taken.

6. **Failure to maintain and keep clean cooling towers and evaporative condensers**

Health and Safety at Work etc Act 1974, Sections 2 and 3, Control of Substances Hazardous to Health 2002, Regulation 7

You have failed to ensure that the exposure of your employees and any other persons, whether at work or not, to legionella, is either prevented or, where this is not reasonably practicable, adequately controlled, because your cooling tower has not been maintained in a clean condition.

Schedule

In order to comply with this notice you should:

[**Note:** detail the precise requirements in relation to the failure to maintain eg you should carry out a clean and disinfection of [name CT or EC here] / review and check the operation of [name dosing equipment here] / carry out a thorough clean of the pack and/or drift eliminators in [name CT or EC here] and carry out any repairs to damaged pack or drift eliminators as required depending on what is not being kept clean.]

OR

Any other equally effective measures to remedy the said contravention may be taken

7. Failure to carry out effective monitoring (of the preventive and protective measures)

Health and Safety at Work etc Act 1974, Sections 2 and 3; Management of Health and Safety at Work Regulations 1999, Regulation 5.

You have failed to carry out effective monitoring and review to ensure that the preventive and protective measures are in place and adequate and in particular you have not carried out active monitoring in the form of checks on [the conditions that favour the proliferation of legionella bacteria and other micro-organisms / the maintenance of the cleanliness of the system and the water in it / the water treatment techniques]

OR

Any other equally effective measures to remedy the said contravention may be taken

8. Provision of adequate information instruction and training for competent persons

Note: use where responsible person has been appointed without the necessary competence, and where others providing health and safety assistance in relation to legionella risks are not competent to do so.

Health and Safety at Work etc Act 1974, Sections 2 and Section 3, The Management of Health and Safety at Work Regulations 1999, Regulation 5, COSHH Regulation 12

You have failed to provide adequate information, instruction and training for your appointed responsible person to enable them to properly assist in undertaking the measures they need to take to assist you to comply with your legal requirements in relation to preventing or reducing exposure to legionella bacteria.

Schedule

In order to comply with this notice you should:

1. Provide instruction, information, training, resources etc. to enable your appointed persons to carry out their tasks completely and safely. In particular they should know:
(a) Potential sources of legionella bacteria and the risks presented;
(b) the measures to be adopted, including precautions to be taken for the protection of people and their significance.

OR

Any other equally effective measures to remedy the said contravention may be taken

9. Failure to provide safe access to cooling tower

Health and Safety at Work etc Act 1974, Section 2(1) & 3(1); The Work at Height Regulations 2005, Regulation 6(3)

You have failed to take suitable and sufficient measures to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury, whilst undertaking the routine safe control measures necessary for the safe operation of you XXX type cooling tower (designated as cooling tower XY1) with particular respect to the inspection, cleaning and maintenance of the top mounted fan, drift eliminators or other relevant parts.

10. Deferred Prohibition Notice – To deal with risk of serious personal injury

The Health and Safety at Work Etc Act 1974, Sections 2 (1) and 3 (1), Control of Substances Hazardous to Health Regulations 2002 (as amended) Regulation 7(1)

Conditions within the cooling tower (X) exist that would allow the proliferation and dispersal of legionella bacteria"…….

(because)

Measures are not in place to prevent or control the growth of legionella bacteria in cooling tower (X) and associated pipework, presenting a risk of infection to employees and others. I hereby direct that the said activities shall not be carried on by you, or others under your control, after XXX unless the said contraventions and matters have been remedied.

APPENDIX 3 – pre-visit letter

Dear [insert dutyholder name]

HEALTH & SAFETY AT WORK ETC ACT 1974

CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH REGULATIONS 2002 (COSHH)

MANAGEMENT OF THE RISKS FROM LEGIONELLA IN COOLING TOWERS AND EVAPORATIVE CONDENSERS

HSE recently wrote to you and requested that you complete and return a questionnaire[6] to help us target inspections of sites with cooling towers or evaporative condensers. Based upon the results of that questionnaire, we have decided to visit your premises at the address above.

A member of HSE *[or the relevant local authority, for local authority enforced premises]* staff will be contacting you shortly to arrange a suitable date. Please ensure that on the day of the visit:

- the necessary personnel are available, **including your responsible person**;

- all associated paperwork and records are at hand (e.g., risk assessment, written scheme of control, monitoring data including analysis of cooling tower pack cleanliness and any photographic evidence obtained as part of your monitoring system). Where information is contained within large documents, please ensure that someone is available to highlight the relevant parts. This will enable inspectors to carry out the visit in a timely and efficient manner;

- it would aid the inspection if you are able to make arrangements for the fan servicing the evaporative cooler to be turned off for a period of approximately one hour during the visit, so that a physical examination of the system can be carried out.

In the meantime, should you have any queries regarding this matter, please do not hesitate to contact me by telephone: [insert contact number]

I appreciate your further co-operation in this important matter.

Yours sincerely

[6] A blank copy of the questionnaire can be found at http://www.hse.gov.uk/legionnaires/assets/docs/legionella-control-questionnaire.pdf

APPENDIX 4

Management of the risks from legionella in cooling towers and evaporative condensers

Health and Safety Executive - Safety Notice	
Department Name:	Specialised Industries Division
Bulletin No:	SID 2-2012
Issue Date:	27 July 2012
Target Audience:	Any industry sector which uses cooling towers or evaporative condensers
Key Issues:	This safety notice draws attention to key aspects of the proper management of the risks from legionella.

Introduction:

This safety notice draws attention to key aspects of the proper management of the risks from legionella. It is informed by a recently completed review of outbreaks in the UK over the past ten years that shows common failings in control, and a potential risk of further legionella outbreaks, such as that in Edinburgh in June 2012. This notice refers to cooling towers and evaporative condensers but the principles apply to other water systems.

Legionella safety - general approach

If not vigilantly controlled, the risks from legionella in cooling towers and evaporative condensers can become serious, and problems can build up rapidly. Fortunately, the means of control are well understood. An effective approach is set out in HSE's Approved Code of Practice L8: Legionnaires' Disease - The control of legionella bacteria in water systems

An analysis of past outbreaks indicates it is vital to follow the practical advice in L8 on:

a. identifying and assessing sources of risk;

b. preparing a scheme for preventing or controlling the risk;

c. implementing, managing and monitoring precautions;

d. keeping records of the precautions; and

e. appointing a senior person to be responsible for making sure that (a) - (d) happen.

Risk identification and control

90% of the outbreaks had their root causes in failures to identify risk (i.e. to recognise possible legionella problems) or to put in place effective schemes of control to deal with the identified risks. These failures left the plant vulnerable to a range of practical threats, for example from:

- departures from planned maintenance and cleaning schedules (allowing plant conditions to get worse, and longer periods for problems to develop);
- changes in the process (leading to changes in the risks, or rendering existing precautions ineffective);
- staff/contractor changes (leading to a loss of knowledge);
- intermittent use of plant (resulting in inconsistent control measures);
- unusual weather conditions (eg bacteria multiplying very fast in warm weather).

The written scheme for controlling the risk should be specific to the site and system, and supported by clear working procedures. It should be updated whenever issues which can affect the ability to control the risks change e.g. as in the examples above.

System monitoring

Effective and consistent monitoring of water quality is essential to maintaining control including:

- chemical and biological monitoring and focused, specified visual checks that the system is working as it should be.

Routine monitoring of bacterial levels, whilst a useful tool, is no substitute for making sure the plant is kept in good condition and is cleaned regularly.

Carrying out system monitoring, then interpreting the results and identifying trends, all need specialist knowledge. For instance, it is not good practice to rely on frequent shot dosing for routine control without identifying the underlying problem of why the bacteria levels keep increasing.

Advice for senior managers

Senior managers (including the responsible person at (e) above) should seek assurance that effective controls are in place and that they are maintained. They should ensure that monitoring and auditing are carried out and the results acted on.

Lack of training and poor communication have been identified as contributory factors in outbreaks of Legionnaires' disease. It is therefore important that everyone involved is competent, trained and aware of their responsibilities. This is made more challenging by the likely division of roles between the company on site, maintenance staff, the water treatment contractor and (possibly) a separate subcontractor for cleaning and disinfection.

Roles and responsibilities must be assigned to named individuals with clear lines of communication, tracking and signing off of work. The company must have adequate oversight of contractors. Contractors should have clear responsibilities and reporting lines.

Further information

Further information and assistance is available on the HSE website

- Legionella and Legionnaires' disease

General note:

Please pass this information to a colleague who may be responsible for or use cooling towers or evaporative condensers.

APPENDIX 5

Work recording on the Legionella Programme Initiative Database - LePID

A dedicated database has been developed to allow Local Authority officers to record details of their visits. LePID can be accessed by designated users using their normal Extranet/HELEX log on. A link to LePID Database will be available in early January.

If you would like to add any additional sites not mentioned on your web page you are asked to contact LAU via: helaextranetenquiries@hse.gsi.gov.uk

The following data fields will be available for you to complete:

Data field	Format	Data required
Unique ID Number		This will be pre-populated
Company or Site Name		This will be pre-populated (If incorrect, please tell us in the comments box)
Local Authority		This will be pre-populated
Is this site suitable for a visit?	Pick from drop down menu	Yes or No
If you selected no, please state why?	Comments (Free text)	If information is incorrect against the Company, Site Name, Site Address, Post Code, or the number of Cooling Towers or Evaporative Condensers is incorrect, please provide details.
Site Address		This will be pre-populated (If incorrect, please tell us in the comments box)
Post Code		This will be pre-populated (If incorrect, please tell us in the comments box)
FOD Region		This will be pre-populated (If incorrect, please tell us in the comments box)
Number of Cooling Towers		Add number
Number of Evaporative		Add number

Condensers		
Lead Enforcement Officer	Free text	The name of the inspector that undertook the inspection.
Lead Enforcement Officer Contact Number	Free Text	Please enter you main contact number/s
Initial Inspection Date	dd/mm/yy	The date when the first site visit was made or the date the decision was made that a site visit was not suitable.
Inspection Topic Rating – RISK ASSESSMENT	Pick from drop down menu	Choices are: 10 – no/nominal risk gap, i.e. (no formal action necessary or verbal advice/advice letter given); 20 – moderate risk gap, i.e. (initial enforcement expectation is an enforcement letter); 30 – substantial risk gap, i.e. (initial enforcement expectation is an improvement notice); 40 – extreme risk gap, i.e. (initial enforcement expectation is improvement notice / prohibition notice and/or prosecution.
Inspection Topic Rating – WRITTED CONTROL SCHEME	Pick from drop down menu	Choices are: 10 – no/nominal risk gap, i.e. (no formal action necessary or verbal advice/advice letter given); 20 – moderate risk gap, i.e. (initial enforcement expectation is an enforcement letter); 30 – substantial risk gap, i.e. (initial enforcement expectation is an improvement notice); 40 – extreme risk gap, i.e. (initial enforcement expectation is improvement notice / prohibition notice and/or prosecution.
Inspection Topic Rating – IMPLEMENTATION OF CONTROL SCHEME	Pick from drop down menu	Choices are: 10 – no/nominal risk gap, i.e. (no formal action necessary or verbal advice/advice

		letter given); 20 – moderate risk gap, i.e. (initial enforcement expectation is an enforcement letter); 30 – substantial risk gap, i.e. (initial enforcement expectation is an improvement notice); 40 – extreme risk gap, i.e. (initial enforcement expectation is improvement notice / prohibition notice and/or prosecution.
Inspection Topic Rating – RECORD KEEPING	Pick from drop down menu	Choices are: 10 – no/nominal risk gap, i.e. (no formal action necessary or verbal advice/advice letter given); 20 – moderate risk gap, i.e. (initial enforcement expectation is an enforcement letter); 30 – substantial risk gap, i.e. (initial enforcement expectation is an improvement notice); 40 – extreme risk gap, i.e. (initial enforcement expectation is improvement notice / prohibition notice and/or prosecution.
Enforcement Action	Pick from drop down menu	a) Prohibition Notice /Consider Prosecution (Please complete comments) b) Improvement Notice (Please complete comments) c) Letter (Please complete comments) d) No Breach
Comments - Key points only	Free text	This needs to be completed if:- If enforcement action is taken. Please provide details of the Regulation(s) breached which resulted in enforcement action.

APPENDIX 6 – HSE H&S supplement on legionella

Legionellosis - dealing with the risk of exposure

- **Introduction**
- **Responsibilities**
- **Main principles**
- **Inspection/examination of potential Legionella sources**
- **Actions if you are inadvertently exposed**
- **Further reading**

Introduction

Legionella is a genus of bacteria, which gives rise to the risk of infection from diseases collectively known as legionellosis. These diseases consist of both pneumonias and non-pneumonic illness that in a minority of cases can be fatal. Exposure occurs when an aerosol or spray of water containing the bacteria is inhaled. This happens extremely rarely in nature, but can readily happen in artificial systems, the most common of which are:

- wet cooling systems incorporating either a cooling tower or an evaporative condenser;
- hot and cold water services;
- humidifiers and air washers;
- spa baths or similar.

Hot and cold water system, and cooling towers/evaporative condensers pose the greatest risk.

Responsibilities

You should not undertake any inspection of water systems incorporating cooling towers and evaporative condensers or an investigation into an outbreak of legionellosis unless you are familiar with and understand the content of HSE's operational guidance on this and the Approved Code of Practice and guidance document (L8) *Legionnaires' disease: the control of legionella bacteria in water systems*, and are deemed competent and authorised to do so by your line manager.

If you have not attended the FOD Control of Legionella: inspection of water systems course[1], or are not accompanied by a colleague that has, you should not continue beyond examination of the assessment and monitoring regime to the physical examination of a system..

If you are immuno-suppressed, or suffering from any condition that might make you more susceptible to infection, you should not participate in an inspection or an outbreak investigation.

Line managers must satisfy themselves that their staff possess an appropriate level of competency for the inspection or investigation task at hand, and

ensure that the limits of the inspection of investigation are agreed and understood. Where in an emergency staff with limited training and/or experience are deployed alongside colleagues with sufficient training and/or experience, such as specialists, any role that individual has in assisting with the control of exposure should be made clear.

Experienced staff accompanying less experienced colleagues must ensure they advise them on avoidance of exposure to risk as necessary.

[back to top]

Main principles

The risks can be mitigated by:

- sound training for visiting staff (in which a key factor is learning to recognise risks)
- clear understanding of roles and responsibilities
- planning and conducting site visits according to HSE's prescribed procedures

The aim is to avoid the risk of exposure by carrying out your duties without entering areas where exposure to Legionella may occur, for example, by not approaching cooling towers being pressure washed.

If you are in any doubt about the hazards you face or whether control measures are adequate to safeguard your own health and safety, you should withdraw from the area and seek advice from your line manager or an experienced colleague.

In some situations (e.g. offshore) you may have to use the duty holder's hot and cold water systems. If you are in this position, you need to assure yourself that the systems are properly managed so you are not put at risk. If high counts of Legionella are found while you are on an offshore installation, you should follow the controls put in place by the duty holder (e.g. not using showers).

[back to top]

Inspection/examination of potential Legionella sources

You can examine the duty holder's:

- risk assessment
- management systems
- operational procedures
- records of: operation, water treatment, cleaning and disinfection, maintenance, and monitoring

However, even if all this is in order, you should not assume that the system is definitely safe.

You may only make a close physical examination of potential sources of legionella (especially a cooling tower or evaporative condenser) if you have received formal training on the FOD Control of Legionella: inspection of water systems course. The detailed arrangements for inspection of legionella sources are covered on the course and must be adhered to carefully. More details about inspection of potential sources of Legionella are found in the relevant OCs.

Under no circumstances should you take any sample of water, sludge or biofilm that is contaminated or likely to be contaminated with Legionella.

If you are likely to be in the vicinity of an outbreak, particularly if inspecting premises with wet cooling systems, you should be immediately alerted.

During an outbreak investigation there may be a need for you to see installations in situ. If so, you should first look to ensure that the installation is made non-operational before a physical examination takes place. If for safety reasons it is not possible to make the installations non-operational, you should contact a specialist and ask for advice on how to proceed.

[back to top]

Actions if you are inadvertently exposed

The early symptoms of Legionnaires disease are similar to those of ‘flu:

- High temperature, fever and chills
- Cough
- Muscle pains
- Headache

If you have any manifestation of these symptoms within 2 weeks of possible exposure you should contact your GP.

If a diagnosis of legionellosis is confirmed, you should immediately alert any other HSE staff who were with you at the time of your exposure and advise them to visit their GP. You should also inform your line manager who has a responsibility to complete an internal report (IH1) and RIDDOR notification.