The Journal of the Water Management Society

THE WATER MANAGEMENT SOCIETY

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An Interview with Diane Lindsay

Scaling UP! H2O: Raising the Bar in Water Management Education

Legionella longbeachae and Legionellosis

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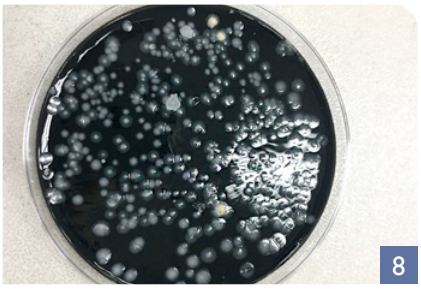

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PipeLine

Jemma Tennant, WMSoc Chair

Welcome to the summer edition of Waterline. After a very hectic spring for the Water Management Society, I am sure we are all looking forward to a bit of rest and relaxation this summer.

I am pleased to report that my first AGM went well, and you can read the full report and details of the new Fellows later in this edition. The summer event was also a great success, more details on that in the autumn edition, but it was great to see so many colleagues old and new at Cranfield University again this year.

The events team have been doing a great job this year so far with free member webinars which are all available to view on the member's portal, along with the face to face events at SPATEX and Cranfield. The autumn is looking quieter for WMSoc events as we know so many of you attend other events in the second half of the year, but we will be providing a webinar on Dental Guidance in September and organising the water theatre at Healthcare Estates in Manchester on the 21st & 22nd October. Why not pop along and say hello to the team.

To make sure we continue to drive the Society forward in the ways that you, our members, want we will be sending out a membership survey soon. Please take a few minutes to give us your thoughts on the work that we do, and more importantly what we can do better, to help us to improve. The Council is, after all, here to serve you.

Talking of the Council, I was pleased to see Ian Penney, Pam Simpson and Mike Hunter return to Council after a vote of membership, with the addition of Kimberly Arbuckle who joins our Council team. I'm sure you will all join me in wishing her well in her tenure.

Two other changes have taken place recently, Mike Hunter has stood down as director of the Society leaving 3 directors guiding us forward, and Graham Thompson has taken the reins as the Chair of the Technical Committee. You can read more from Graham in the committee updates on page 64 and we thank Ian E Kershaw for his time in that role.

Well, that's enough from me, I think. We hope you enjoy this edition with a focus on Legionella Longbeachae and take some downtime to recharge the batteries this summer.

Kind regards,
Jemma Tennant
WMSoc Chair

Letter to the Editor

Dear Waterline,

We often see water system components which have been wet tested by manufacturers prior to shipping. This is done to ensure that the fittings (for example, taps, showers valves etc.) are water tight and can withstand the maximum pressure rating they state in their guarantee e.g. 15 bar. . But at what cost to water system health especially if the water is pre-contaminated with harmful pathogens? Something that requires some thought, especially for those involved in healthcare installations.

The NHS Estates Technical Bulletin (NETB) No.2024/3 issued in 2024 provides guidance on designing safe spaces for patients at high risk of infection from nontuberculous mycobacteria and other waterborne pathogens. Its purpose is to enhance the existing guidance set out in HTM 04-01 (safe water in Healthcare premises), to address risks from nontuberculous mycobacteria (NTM) and other waterborne pathogens and to identify specific measures required for new hospital premises and major refurbishments for those patients at greatest risk of healthcare-associated infections.

This new guidance document again mentions the dangers of wet testing by tap, shower and fittings manufacturers. Going further than the previous mention in HTM04-01 Part A (3.44) it states that the Project Water Safety Group should ensure that no materials, components or fittings of the water system infrastructure should be procured and/or installed that present a risk of microbial contamination of water systems or associated equipment. This means that 100% of all components, fittings or any equipment to be used during installation and commissioning should not have previously been used and/or wet tested. For these high-risk patients, each item should be individually packaged and be accompanied by a manufacturer's certificate which states that the fittings will have no adverse effect on water safety and that they have been tested by a validated process.

I wonder how many manufacturers are currently providing both dry tested components together with these certificates? I would suggest not many if any at all, and that's probably because water testing is easy and low cost and has been around for a very long time. Dry testing for pressure and leaks requires a costly investment in new testing equipment and staff training.

However, the switch is definitely long overdue. Manufacturers have been aware of the dangers that wet testing poses for many years, and it has been mentioned in UK guidance since 2016. So, I would urge anyone reading this to request these certificates and proof of 100% dry testing citing the Technical Bulletin above.

Yours,
Jonathan Waggott

NEW members

Since the last edition of Waterline was printed, the WMSoc has approved 29 new membership applications. We welcome members from the following sectors of the industry:
Water Hygiene – 12, Building Services – 3, Consultancy – 2, Facilities Management – 2, Water Treatment – 8, Healthcare – 2.

The following new members have given permission for their names to be printed:
Daniel Borg, Charlee Butler, Robert Carslaw, Steve Cockburn, Timothy Drane, Christopher Francis, Austin Gibbons, Kyle Glaser, Rachel Griffiths, Timonthy Lees, Samuel Luscombe-Green, Ryan Marshall, Alan McKenna, Tony McMahon, Bob McNeill, Jenni Nolan, Barry Ollerhead, Nick Phillips, Chris Pugh, Thomas Purse, Daniel Ready, Nick Rostron, Amima Shahzadi, Luis Shakeri, Ashley Shields, Chris Smith , Thomas Swann, Rob Wright, Oliver White.

From the Archive: This article first appeared in waterline Spring 2022

InFocus Article
Legionella Species: Prominence and Implications for Industry

Matt Morse, LCA Manager, and Nick Barsby

Legionella Anisa being the most prominent species, over and above Legionella Pneumophilia, was the surprising finding from the recently released information from the Legionella Control Association [1](LCA). The fact that over 53% of them had *L. anisa* from a dataset of 70,000 positive results, compared to 32% *L. pneumophilia* was unexpected. It had been a long-held industry opinion that *L. pneumophilia* was the bigger concern and the biggest risk. This approach was based on data (Joseph, 2002 [2]) which found *"70% of Legionella infections are caused by L. pneumophila serogroup 1, 20–30% are caused by other serogroups, and 5–10% are caused by non-pneumophila species"*.

Traditionally, we have seen the response to any Legionella Species be treated as less of a risk to Human Health than *L. pneumophilia*; and even then Sero-Group 1 was always felt to be a higher risk than Sero-Groups 2-15. Yet over 25 of the Legionella Species are known to be pathogenic to humans[3].

The data from the LCA shows that *L. anisa* is more prominent in water systems than *L. pneumophilia*; so why are we not finding L. anisa is clinical cases as much? The answer to this Could be the Urinary Antigen Test (UAT), that is commonly used to confirm Legionnaire's disease, has a bias towards *L. pneumophilia*; meaning that *L. anisa* would not be detected using this test. Moreover, a lot of the UAT's only look for *L. pneumophilia* Sero Group 1, not even the full range of pneumophilia. (Shimada 2009 [4]).

We have a clinical confirmation test (the UAT) that is biased towards *L. pneumophilia*, yet this species of legionella is present in around 3 in 10 positive samples, when using the LCA data as a marker. The theory would mean that as many as 7 in 10 UAT could be providing negative results when the patient is infected with Legionella. While the Polymerase Chain Reaction (PCR) method does detect these additional species it is not the routine diagnostic tool and is a cost prohibitive clinical diagnostic tool.

With the guidance, in both Health Technical Memorandum (HTM) 04-01 Part A[5] Part B [6] and the Approve Code of Practice for Legionella (ACoP L8 4th Edition) [7], both treat all species of Legionella as an equal; the tendency to treat different species differently has evolved over time, possibly on the back of empirical evidence such as Joseph (2002). The LCA data suggests that this response is incorrect and could have dangerous consequences.

The guidance, both HTM and ACoP L8, states that when control is lost and growth conditions are present then actions should be taken to reduce the risk. These actions include review the risk assessment and mitigate the risk while remedial work is undertaken. Point of Use filters are an excellent short term risk mitigation tool that can prevent exposure to a wide range of pathogens in addition to all species of Legionella. PoU filters are mentioned in HTM 04-01 and the Health and Safety Guidance (HSG 274) Part 2 [8] as risk mitigation tools while remedial work is undertaken.

REFERENCES

1) https://www.legionellacontrol.org.uk/news/121/

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4) Shimada T (2009) Systematic Review and Meta analysis Urinary Antigen Tests for Legionellosis in CHEST Journal Volume 136, Issue 6 1576 – 1585

5) Health Technical Memorandum 04-01 Safe water in Healthcare Premises Part A: Design, installation and commissioning (2016) Paragraph 4.22 – 4.24

6) Health Technical Memorandum 04-01 Safe water in Healthcare Premises Part B: Operational Management (2016) Paragraph 7.45 – 7.49

7) Approved Code of Practice for Legionella (4th Edition) (2013) Paragraph 58

8) Health & Safety Guidance 274 Part 2 "The control of legionella bacteria in hot and cold water systems" (2014) Paragraph 2.117

An Interview with Diane Lindsay

by Jordan Allsop

Diane & Jordan

Tell me a bit about yourself & your career?

Hi, I'm Diane Lindsay and I'm a State registered principal clinical scientist, leading and overseeing the clinical research and development aspects of *Legionella, Streptococcus pyogenes* and vaccine preventable respiratory bacteria within the Scottish Microbiology Reference Laboratories, Glasgow.

I finished my PhD on whooping cough and started my career working in the NHS in 1991 - devising a urinary antigen Enzyme-Linked Immunosorbent Assay (ELISA) for Legionella. ELISA's are commonly used laboratory tests, to detect and measure the presence of a specific substance, like antibodies, antigens, proteins, or hormones, in a sample. Back in those days, there was no ELISA test that you could simply buy 'off the shelf' to detect Legionella antigen in urine, so I devised an in-house ELISA, which was easier than expected as that was a big part of my PhD training.

I started on a three month contract nearly thirty five years ago and they still haven't got rid of me!

My job role soon changed and covered all areas of Legionella at the time, including culture, urinary antigen, serology, and both water and human testing. There was only myself and one other person responsible for this at the time. It was then decided we were at critical mass and they were concerned as to what would happen if one of us became ill, moved, or retired. With this in mind, we merged with another reference lab that included vaccine preventable organisms: whooping cough, *Haemophilus influenzae*, *Neisseria meningitidis* and *Streptococcus pneumoniae*, and also started typing *Streptococcus pyogenes* or Group A Strep. I've gone from knowing a lot in one field, to having to be a generalist in a lot of different areas but it makes it more interesting. I have to say though, I'll always love Legionella. It's my favourite bug!

What initially sparked your interest in microbiology?

My parents would take me to the library every week and I would get books on hematology & biochemistry. I was such a nerd! I wasn't the brightest at school and didn't particularly excel academically, but I think if you try hard and put your mind to something, you can achieve anything. I had a younger sister who died of cancer when she was five years old, so I wanted to go into something where I could make a difference. I suppose we all think we can find a cure for cancer but not everyone can do that. I also had a fantastic biology science teacher, Mr Cameron, who encouraged me to do a Microbiology project in my final year. I think if you have a great teacher, they inspire you to go on and achieve greatness. So, I think it was a combination of having caring parents, family trauma, a great teacher, and sheer hard work, that meant I found my path to Microbiology.

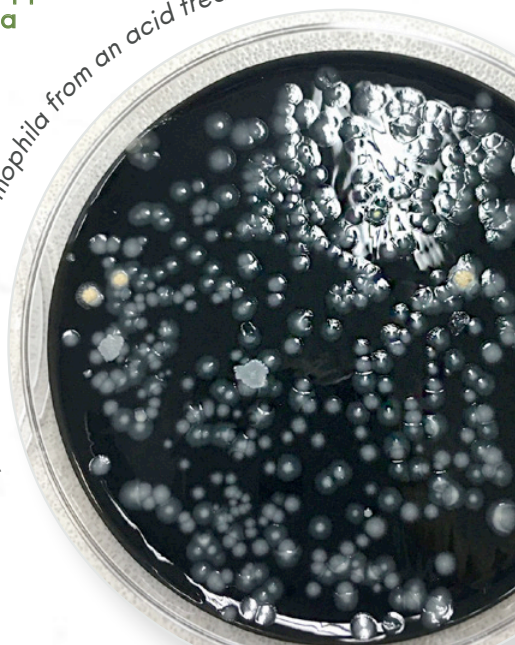
What does a typical day look like for a microbiologist?

Each day is different. My job isn't so much hands on in the llab anymore, as I'm more desk based now. On a day to day I can be involved in going through the backlog of emails from over the weekend, I could be on an IMT (Incident Management Team) meeting about an outbreak; I'll look at lab results and provide advice on how we manage the patient, which can involve looking at the background of the patient, for example their case history and symptoms. You can't look at lab results in isolation, you need to look at the bigger picture. I will also phone out results, I do this to update clinicians and public health, especially if there is a Legionnaires' Disease case, for example, so they can do enhanced surveillance. At the start of an outbreak, an IMT meeting is called and this involves multiple groups of people needed to manage the issue. I might also be writing guidance, scientific papers, analyzing data, and sequencing cluster reporting. There is also a lot of teaching, from undergraduate up to PhD level. Before becoming more desk based, a day to day would include: Devising new tests, setting up multiple assays, analyzing and reporting on these tests and phoning results to sending labs and clinicians.

Legionella urinary antigen ELISA

Are there any mentors or scientists that influenced your approach to research Legionella longbeachae?

Dr Ron Fallon, who has a Legionella named after him called *Legionella fallonii* (that's when you know you've made it!). He had a very inquisitive mind and brought Legionella testing to the UK. Another was my PhD supervisor, Professor Alistair Wardlaw. He



Mostly Legionella pneumophila from an acid treated water sample

would always ask me questions that I couldn't answer, so I'd have to go and find out the answer, and he would then ask me something else I didn't know. I found this a really great way of learning and thinking things through.

What would you consider your most significant professional achievement?

- The research I have been involved in has been fascinating, and nothing beats the eureka moment when something works that has been eluding you for months. I have always tried to remain patient focused. At the end of the day, if you can diagnose someone quickly and they can receive the correct treatment, you could have saved a life or halted an outbreak that might have infected others.

- I am also proud of the scientific papers, especially the genomics ones which helped me meet and collaborate with a lot of really smart colleagues, some of which are now friends, so I feel lucky to have had that opportunity.

- Training the next generation has been a wonderful opportunity. I've had some really great experiences along the way and met some exceptionally bright and talented people. I think if you can reach the end of your career and you don't have many enemies, then you've not done too bad. I'd like to think I get along with most people, and I feel we achieve so much more when we collaborate and work together to reach a common goal. We should all retire feeling like we have inspired others to continue our legacy.

- I made it to chair of the ESCMID (European Society of Clinical Microbiology and Infectious Diseases) study group for Legionella infections. It plays a crucial role in continuing education, research support, and networking for professionals in this area. It's across Europe but we have had an increase in our membership by 400% from across the globe. I've also recently become an ESCMID Fellow, which is an honour.

Outside of work, do you have any hobbies or interests?

I have lots of hobbies and interests, but I'll only mention a few:

- I sing in the community choir - I love it even though I know I'm not the best singer, but it doesn't matter, because when we all sing together, we sound brilliant! My claim to fame is that I sang with Michelle McManus at a recent Christmas concert. For those of you that don't know Michelle, she won the second series of Pop Idol in 2003 with 'All this time'.

- I enjoy walking. I walk the legs off of my husband and any dogs that we occasionally look after.

- I'm in a creative writing group and I am currently trying to write a novel (though it is nowhere near finished), so it may be more than scientific papers to my name in the future!

- I practice mindfulness and have attended mindfulness courses in the past – they're great for stress relief! I once signed up for a silent retreat (by accident) but I managed it - I said nothing for 2 days. Yes, 2 days! Not one word, but I have to say, I thoroughly enjoyed it.

- Lastly, I would like to grow my own vegetables. There are allotments near me and this nicely introduces the main topic of this interview - *Legionella longbeachae*.

About Legionella Longbeachae

I love talking about *Legionella longbeachae*, but usually when I start a conversation about this people say 'here we go, Diane is talking about Legionella YAWNbeache again!', but I actually find it really fascinating so I try and share my enthusiasm.

Legionella Longbeachae INTERESTING FACTS:

- *Legionella longbeachae was first discovered in Long Beach, California in 1980.*

- *Legionella longbeachae is often associated with compost or potting soil.*

- *Something I am excited to share is an ESCMID poster 'Legionella longbeachae: an emerging pathogen in Northern Europe' that was accepted for ECCMID global in Vienna this year (see page 27). It was a collaboration with ESGLI colleagues from Sweden, Norway, Finland, Denmark, and Scotland that have all seen increasing cases in 2024.*

- *Some studies suggest trees may be the source of Legionella longbeachae, as potting mixes often contain pine bark and sawdust. Weirdly, Bob Dylan wrote a song called 'Legionnaires' Disease', and his lyrics are: 'But whatever it was, it came out of the trees. Oh that legionnaires disease' - which may be coincidental, but I think Bob was onto something even in 1981!*

Can you briefly explain what Legionella Longbeachae is?

It is a Legionella species that was identified in 1980 not long after *L. pneumophila* Serogroup 1 after the Philadelphia outbreak at a Legionnaires' convention in 1976. It's very different from *Legionella pneumophila*.

Some key differences are:

- It has a relatively large genome compared to other Legionella species.

• *Legionella Longbeachae* has a capsule, whereas *L.pneumophila*, or any other species that I am aware of don't. The capsule may stop the bacteria from drying out in compost, and also makes it more difficult to destroy if it does get into the lungs.

• *Legionella longbeachae* does not possess a flagella (a tail), as it doesn't have to move in water like *L.pneumophila*, which do have a flagella.

• It has 'pili', which is involved in chemotaxis, so it kind of shimmies a little bit to a food source or away from anything nasty, so it doesn't move like other legionella through water. This makes it sound quite cute, but don't be fooled, we're still talking about an organism that can cause life threatening infections.

• It is mainly found in growing media (soils, compost, etc). People say they have isolated it from water, but I have never isolated it from water in my thirty five working years – I've only isolated it from compost, and in those instances sometimes in huge numbers per gram.

• *Legionella longbeachae* is distinct from *L.pneumophila*, but has just evolved and adapted to living in a different moist environment.

How does it affect the human body?

In the UK, Legionnaires' disease is defined as a pneumonic illness with laboratory confirmation by urinary antigen, culture and/or PCR. Sometimes you can have it in other areas of the body that are not in the lungs. There have been cases of *L. longbeachae* infection of the skin where there has been a cut by a rose prick. There have also been cases of other Legionella species found in abscesses, joints, heart valves, and necrotic tissue. Legionellosis includes not just Legionnaires disease but also Pontiac fever, which is a milder form of infection and is more like a flu-like illness. No one is very sure what causes Pontiac fever, but it may be a sensitization of the respiratory mucosa with an endotoxin from the bacteria.

Food for thought - How does Legionella get into unusual places?

Sequencing has shown that we can identify the same isolate that hasn't changed from the Philadelphia outbreak in 1976 in Australia 40 years later. Bacteria change and mutate through their life, so how did the exact same strain get there?

Some people think it's up in the stratosphere, inside encysted amoeba in suspended animation and eventually comes back down to earth. Another theory could be that subclinical cases transport Legionella in faeces around the globe, or maybe our transport network moves it around in boats and aeroplanes that hold water.

TOP TIPS to reduce your risk of exposure:

• Opening bags of compost outside.

• Avoid creating an aerosol.

• Wash your hands after use.

• Don't sniff your compost .... This happens quite often, believe it or not. Putting something that is microbial rich up to your nose might not be the best decision you'll ever make!

• Do not store compost in a warm environment like a greenhouse or shed. Legionella like nothing better than a warm place to grow!

Our first case of *Legionella longbeachae* in Scotland was in 2004. The patient had travelled back from Australia, where they had been gardening, so we think it was a travel associated case. We started to see more cases from 2008 - 2012, when there were about eleven cases. However, late in the summer of 2013, we had seven cases within six weeks. All cases were culture positive for *L. longbeachae*. An investigation was started and we noticed people were storing compost in sheds, green houses, and even in their home - all places that are likely to get warm, and if the environment is warm, then bacteria are going to multiply. Opening bags of compost in enclosed spaces also means there is a much greater risk of exposure. I've always said, if you are opening a bag of compost, please open it outside, and always wash your hands after use.

The compost companies are very adverse to putting any kind of warnings on compost bags or labels. I once visited a compost factory and they advised that compost leaves the factory 'Legionella free' as it was PAS 100 treated. This is a pasteurization process, which means it is kept at 65 degrees centigrade for seven days to kill any enteric bacteria that would cause sickness or diarrhoea, but it would not necessarily kill Legionella because

Blues white Legionella anisa spelling out ESGLI (European study group for Legionella infections)

they are associated with amoebal protozoa. They can hide in encysted amoeba. You can heat these up to 65 degrees and they are not affected. The temperature then reduces, and the Legionella comes back out of the amoeba. The pasteurisation process may be good for enteric organisms, but not for *Legionella*.

Maybe Southern Europe do not see cases as it is so warm outside they don't need greenhouses like we do in Northern Europe, so they are opening their compost outside, which could be a factor for reducing risk.

How do you identify *Legionella longbeachae?*

Usually by culture. Firstly, we get a respiratory sample, for example sputum from a patient. We then perform a PCR (Polymerase Chain Reaction) assay. The PCR detects *Legionella* species and *Legionella pneumophila*. If it is a pneumophila, it also reacts with a *Legionella* species target as after all, *L. pneumophila* is still a *Legionella* species. If the sample only reacts with *Legionella* species, not a pneumophila, we can say it is not a pneumophila. Next we would try to culture it and isolate the *Legionella longbeachae*. Our culture's success rate is around 50%. The majority of *Legionella* species we see are *L. longbeachae*.

Have there been any significant outbreaks of Legionella Longbeachae in recent years?

There have been clusters. We have looked genomically at the patient and related compost isolates. We found multiple types in the compost which were very diverse and the patient isolates were one single type of *L. longbeachae*. Often, we didn't identify the same type in the compost that the patient had been using, but we identified it in another compost that another patient had been using. Generally, if they are infected it is with only one type or clade.

We stopped looking to identify the source, this is because we had one patient where we took eighteen individual isolates from the compost that they were using and they all eighteen were different from the one that affected the patient. It is very difficult to link a patient to a compost unless you are very lucky.

There has been a Swedish 'outbreak' where they saw an increase in cases and trends during the spring and summer. This is more likely when the compost is in use, but they are not linked to a single *Legionella longbeachae* strain.

ENDING QUESTION

What advice would you give to someone considering being a microbiologist?

1) I would say it is really important to do the right course! Consider courses that will lead to a job and becoming registered. If you want to be a biomedical scientist, there are plenty of jobs in microbiology and biomedical science, so go and do an accredited course.

2) Clinical scientist training roles are as 'rare as hens teeth', as my granny would say, it's very hard and competitive and you usually need a PhD, but there are some equivalence routes into clinical science for microbiologists.

3) Clinical is more research and development, which is really interesting because the biomedical scientist does more of the day to day testing, but the clinical scientist will devise tests that then go on to be used on a daily basis.

FUN QUESTIONS

If you were given £1,000,000 today, what's the first thing you would do?

Retire! No, I would probably give it away. I wouldn't want £1,000,000. I mean, I would keep some of it and have a few luxuries like travelling first class, but I would give the majority of it away.

What are the weirdest/funniest things that have happened to you on a trip?

There have been so many! I was away at a conference in Washington during my PhD and I visited Arlington National military cemetery. I was sitting down, listening to a service, and they started playing The Star-Spangled Banner - I didn't recognise it so stayed seated. This army private came over, pointing a gun straight at my face and shouts 'STAND UP missy, show some respect!'. I thought I was going to be killed! I laugh about it now, but at the time it was a scary moment.

Another memory was a vespa trip around Tuscany with a couple of friends. We had never driven a Vespa before and I knew things were not looking good when on the first lesson, I went the wrong way around a roundabout and one of my friends fell off her bike in the middle of a busy junction. We were then in an underground car park, and we had to try and get the Vespa up a very steep slope. I managed it, but neither of my friends did. I looked around, and one had managed to crash into the wall, and my other friend was embedded in a large shopping trolley! They were both just a bit bruised, but we were all hysterical and just glad to have survived!

If your life had a motto or tagline, what would it be?

Never say never! Things change and you need to learn to adapt... like *Legionella longbeachae* to a different environment. The first song lyric that came into my head when asked this question was 'I get knocked down, but I get up again' - Chumbawamba (1997 single) - Gotta love that song!

A note from Jordan Allsop:

As some of you are already aware, Diane is due to retire soon, which means the industry has lost another fantastic contributor and influential person.

This reiterates the importance of knowledge sharing, whilst we have the opportunity!

Thank you to Diane for sharing just a short part of your wealth of knowledge with me. I thoroughly enjoyed the interview with you and had a lot of laughs in the process. I would like to wish you a very happy retirement.

JOIN IN WITH OUR CPD ACTIVTY ON THIS ARTICLE, SEE PAGE 13.

Scaling UP! H2O: Raising the Bar in Water Management Education

By Trace Blackmore, CWT

Hello, Water Management Society members! My name is Trace Blackmore, Certified Water Technologist, water treatment professional, and host of the Scaling UP! H2O podcast. It's an honor to introduce myself and our podcast to your esteemed community. For years, I've been fascinated by what makes our industry tick—from the chemistry of water treatment to the innovation transforming how we manage water systems. And that curiosity led me to launch Scaling UP! H2O, a podcast designed to educate, inspire, and unite professionals in the industrial water treatment field.

What Is Scaling UP! H2O?

Simply put, Scaling UP! H2O is your go-to resource for staying informed about everything happening in water treatment. Every week, we delve into topics that matter most to professionals managing water systems at all levels—whether you're exploring cutting-edge technologies, tackling complex system challenges, or mastering customer relationships.

Since our debut in 2017, the Scaling UP! H2O podcast has become one of the most downloaded and preferred resources in our industry. We release weekly episodes featuring conversations with industry-leading experts, in-depth explorations of technical challenges, and actionable advice to help you succeed professionally. With more than 400 episodes under our belt, we've been ranked in the top 2.5% of podcasts worldwide—a testament to the enthusiasm of the Scaling UP! Nation, as we call our loyal community of listeners.

Why Tune In?

Water management is a multifaceted discipline that requires us to stay sharp and adaptable, and the Scaling UP! H2O podcast is tailored to meet those needs. Here's what you can expect:

1. **Expert Insights:** We host exceptional guests, including scientists, engineers, regulators, and business leaders, who share their expertise on topics like Legionella awareness, reverse osmosis systems, cooling tower maintenance, steam boiler optimization, and the latest sustainability advances.

2. **Actionable Education:** Our podcast is not just about abstract concepts; it's designed to provide you with actionable insights you can apply to your job immediately. Whether it's troubleshooting system inefficiencies or mapping out water management plans, we offer tools you can use.

3. **Industry Trends:** We cover emerging trends such as automation, digital water monitoring, and innovations in green chemistry. Staying ahead of the curve is essential, and Scaling UP! H2O helps you do just that.

4. **Professional Growth:** Mastering technical knowledge is only part of the equation. We tackle topics like leadership, communication, and pricing strategies to help you grow as a water treatment professional.

Most importantly, the podcast fosters a sense of community. By tuning in, you'll join a group of professionals who are passionate about water management and eager to share ideas that push our industry forward.

Content Contributor to The Water Management Society

I'm thrilled to announce that Scaling UP! H2O will soon be contributing content to your official publications. Our partnership aims to elevate the resources available to Water Management Society members by delivering well-researched, engaging articles that align with your mission. Whether you're looking for practical tips, technical breakthroughs, or discussions about industry trends, you'll find scaled-up knowledge right in your publication!

Our articles will draw inspiration from the insightful conversations we host weekly, providing written content that complements the podcast. We believe in the importance of education and collaboration, and I'm excited to bring a fresh perspective to your publication.

Join the Scaling UP! Nation

I want to personally invite you to become part of the Scaling UP! Nation. Whether you're a seasoned water management professional or new to the industry, our episodes are designed to meet you where you are and help you grow. You can catch up on episodes on *www.scalinguph2o.com* or by searching "Scaling UP! H2O" on your favorite podcast app.

Our audience includes thousands of listeners across the globe who tune in weekly to enhance their knowledge and sharpen their skills. By joining the Nation, you'll gain access to invaluable resources tailored toward real-world challenges in water management.

Wrapping It Up

Water treatment is one of the most fascinating fields in the world. As professionals, we manage something that touches nearly every aspect of our daily lives: water. My goal with Scaling UP! H2O has always been to empower, educate, and inspire water treaters to excel and lead in this vital industry.

I look forward to serving the Water Management Society, engaging with its members, and bringing our expertise into your publications. Let's continue to raise the bar for excellence in water management together.

So, what are you waiting for? Tune in to Scaling UP! H2O, and let's keep scaling up your knowledge!

More about The Scaling UP! H2O Podcast

The Scaling UP! H2O podcast, hosted by Trace Blackmore, is a leading educational resource for professionals in the industrial water treatment industry. With weekly episodes and daily digital content across social media platforms, it covers a wide range of topics including water management, treatment technologies, and industry trends. The podcast aims to "raise the bar" in the water treatment field by sharing expert knowledge and practical insights.

GAIN A CPD POINT BY ANSWERING THESE QUESTIONS ON THE 'INTERVIEW WITH DIANE LINDSAY' ARTICLE.

Q1: Where is Legionella Longbeachae commonly found?

Q2: What are the effective preventative strategies for Legionella Longbeachae?

Q3: When and where was the first case of Legionella Longbeachae?

EMAIL YOUR ANSWERS IN TO ADMIN@WMSOC.ORG.UK TO GAIN YOUR CPD POINT.

The answers will be published in the Autumn 2025 edition. A CPD point will be awarded for correct answers received before publication of the next edition of Waterline. Extra CPD points will be awarded to members who provide extra research and/or evidence and to those members whose answers are accepted for publication in Waterline.

1 cpd point

event report

WMSoc - The Society's 46th AGM

Wednesday 11th June 2025

The Water Management Society Annual General Meeting (AGM) was hosted remotely and in person on 11th June 2025 allowing a greater number of members to attend.

Society Chair Jemma Tennant delivered her report noting that her objectives were to continue developing the key pillars of the society, and to form new relationships with other organisations both in the UK and abroad. The relationship with the Legionella Management Advisory Group in Australia was strengthening and Jemma was delighted that Kelvin Slade, representing the organisation, was present in person for the AGM event. The relationship with the Association of Water Technologies in the USA was also developing further sharing technical knowledge between the two organisations.

Female representation on Council continues to be strong and Jemma was pleased to report that overall membership was still healthy with continued new applications and upgrade requests being processed despite the difficult economic climate. She noted "we have received 42 new applications so far this year across all membership grades with five applications to upgrade."

Jemma provided a roundup of the work the Society is doing including the release of multiple toolbox talks on a variety of topics. She also spoke of the investment from the Society in refreshing and developing new training courses in 2024. A vast number of events and webinars had been delivered in the past year with recordings of webinars offering additional benefits to members. This coupled with the ongoing high standard of the Waterline journal ensured the Society continued to deliver on its goal of improving knowledge and industry standards.

Jemma Tennant then introduced the new vice chair, Anthea Davies who joined the AGM remotely and will step into the role of Chair at the 2026 AGM.

Tom Laffey delivered the Honorary Treasurer's Report, reporting a continued surplus in 2024 and noted the continued focus on budgets and expenses by the whole of Council. The Treasurer's Report was approved which included the renumeration of the Society's official accountant.

Members of Council

The Society's Council is made up of volunteers who work to lead the Society with Council meetings occurring every two months. Members of Council also sit on other committees including BCA, BSi, CSCA, LCA and have affiliations with UKHSA, WRAS and SoPHE allowing the Society to remain up to date with important industry developments.

Bill Robinson and Giles Green stood down from Council this year, in addition to Mike Hunter, Ian Penney and Pam Simpson who stood down in rotation and offered themselves for re-election. Mike Hunter also stood down as a director of the Society after his 10 year tenure.

Four new nominations were received from the membership. After a member vote, the following four people have been elected to Council; Kimberly Arbuckle joins as a new member, with Mike Hunter, Ian Penney and Pam Simpson being re-elected.

Fellows

Each year Council reviews the membership list and identifies individuals who qualify for Fellow status, having been a member for more than 10 years and having contributed significantly to the Society or the industry as a whole. This year the Council awarded Fellowships to Robert Wilson and Gary Sewell. In addition the award of Honorary Fellow for exceptional services to the Society and the Industry was awarded to Dr Susanne Surman-Lee. Members can read the biographies of Robert, Gary and Susanne on page 28.

It should be noted that Fellowships cannot be applied for and care is taken that the honour is carefully bestowed.

An update to the bylaws, previously circulated to members, was reviewed and voted in acceptance unanimously and these new bylaws will be adopted and published shortly.

The AGM was then officially concluded.

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Aerial view of the solar tower of the Ivanpah Solar Electric Generating System at California, USA

Waterscan

NEWS FROM THE WHOLE FIELD OF WATER AND ITS EFFECTIVE MANAGEMENT

Renewables % of world's electricity up in 2024...but also CO_2 emissions

Low-carbon energy sources – renewables and nuclear – provided 40.9% of the world's electricity in 2024. This is the first time they have passed the 40% mark since the 1940s, when hydropower contributed around that percentage and coal made up 55%.

Renewable power sources collectively added a record 858TWh of generation last year – a 49% increase on the previous record set in 2022 of 577TWh. Solar dominated electricity generation growth for the third year in a row in 2024, adding 474TWh of generation This was up 29% on 2023.

Global power-sector emissions hit an "all-time high" in 2024, despite solar and wind power continuing to grow at record speed, according to analysis from thinktank Ember. Emissions from the sector increased by 1.6% year-on-year, to reach a record high of 14.6bn tonnes of carbon dioxide (tCO_2). This increase was predominantly due to a 4% growth in electricity demand worldwide, leading coal generation to increase by 1.4% and gas by 1.6%. The increase in fossil-fuel generation was, in particular, due to hotter temperatures in 2024, which drove up electricity demand in key regions such as India.

In a statement, Phil MacDonald, Ember's managing director said: "Solar power has become the engine of the global energy transition. Paired with battery storage, solar is set to be an unstoppable force. As the fastest growing and largest source of new electricity, it is critical in meeting the world's ever-increasing demand for electricity."

Wind generation also grew in 2024, although at a more moderate pace than solar power. Globally, there was an additional 182TWh of wind generation last year, or an increase of 7.9%. Despite continued capacity additions, some geographies saw their lowest increase in wind generation in four years due to reduced wind speeds.

Hydro generation rebounded as drought conditions eased in 2023. This was particularly true in China, where generation increased 130TWh.

Call for higher water bills for properties with large gardens

Water UK is the trade association representing 16 water and sewage companies in England and Wales. It is calling for compulsory water metering and legislative changes to charging in its submission to the government-commissioned sector review. The review, led by Sir Jon Cunliffe, former Deputy Governor of the Bank of England, aims to examine how customers' bills are set, water companies' financial resilience and environmental regulations.

Water metering is currently only compulsory in areas that the Environmental Agency has labelled as "water-stressed" such as Cambridgeshire. According to the industry body, 40% of people in England don't currently have a water meter. Households currently pay a fixed standing charge regardless of if they have a meter, which means that bills don't align directly with water consumption.

Water UK wants the standing charge to be abolished and introduce "block tariffs", where the unit price of water will be higher for households that consume more. Households with large gardens and swimming pools would pay relatively more for their water – with others paying less.

"We think it is much fairer that people pay for the water they use based on how much they use," explained Water UK, Chief Executive David Henderson. Henderson added that water companies are currently under a lot of pressure and must invest in their systems. At the same time, they need to keep bills affordable for the people who pay them.

The Independent Water Commission will deliver its final recommendations to the UK and Welsh governments in June.

Californian sea lions acting aggressively to humans

This March, off the coast of Southern California, a sea lion lunged at a surfboarder, biting him and dragging him off his board. "It looked possessed," he wrote in a Facebook post, saying the animal involved in the encounter just north of Los Angeles was "feral, almost demonic".

South of where he was attacked, a 15-year-old girl was doing a swim test in Long Beach to become a lifeguard when a sea lion repeatedly bit her.

The surfers later learned the animals were suffering from domoic acid toxicosis - a neurological condition caused by a harmful algal bloom; two of dozens of sickened animals have been spotted across California beaches recently.

This particular algae bloom has appeared four years in a row across California, raising concerns it might be turning into an annual event. The bloom of algae started earlier than normal this year and has spread roughly 370 miles of the iconic Southern California coastline.

This neurotoxin accumulates in small fish, like sardines and anchovies, which are then eaten by marine mammals like sea lions in large quantities.

Domoic acid attacks the brain and the heart causing seizures and heart failure. If left untreated, it usually causes permanent brain damage. The toxin will naturally flush from an animal's system over time, but sea lions repeatedly exposed to the toxin will suffer longer lasting and more serious effects.

If these animals come into human care before significant damage occurs, it is possible to help flush the toxin from their systems by giving them fluids. To control any seizures, veterinarians give the sea lions anti-seizure medications that are also used in humans.

Gold Toilet thieves finally flushed out

A gang has been convicted over the theft of a £4.8m gold toilet from an art exhibition at Blenheim Palace. Thieves smashed their way in and ripped out the functional toilet, hours after a glamorous launch party at the Oxfordshire stately home in September 2019.
On the 17th of March Michael Jones was found guilty of planning the burglary and Fred Doe was convicted of conspiring to sell the gold. The gang's kingpin James Sheen has been jailed at least six times since 2005 and has led organised crime groups that made more than £5m from fraud and theft - money authorities have largely failed to recover.
In the months before and after the Blenheim heist, Sheen was leading another group of thieves that made more than £2.6m by blowing up cash machines, stealing high-value farm machinery and other thefts across the south and east of England, including the Newmarket Museum raid. He was sentenced to 17 years for these offences in 2022, more than a year before he was charged with the Blenheim heist. After that trial at Oxford Crown Court, a judge ruled Sheen had personally made £900,000 from the crimes - but was ordered to pay back just £1.
Thames Valley Police said it obtained a confiscation order for a "nominal sum" of £1, which allowed a "parallel financial investigation" to be carried out. It said that - five years after the crimes - financial investigations were "actively ongoing... for a significant amount in assets".

Record sewage dumps in Windermere in 2024

Official figures released by the Environment Agency on 27th March reveal that Lake Windermere was the dumping ground for 6,327 hours of raw sewage discharges from six United Utilities treatment works in 2024.
The lake is almost entirely enclosed, its waters moving so slowly that a single drop of water takes nine months to go from the north side of Windermere to the south. It is also subject to discharges from 1,900 private septic tanks and from agricultural runoff, but the sewage pollution is considered the most significant contributor of phosphorous entering the lake, causing more frequent intense algal blooms, which reduce dissolved oxygen levels and harm water quality and aquatic life, in some cases driving them to extinction.
This month the environment secretary, Steve Reed, vowed to break with the recent past, standing on its shores and promising that Labour would "clean up Windermere".
Reed's promise was welcomed as a historic moment by Matt Staniek, a campaigner who has almost singlehandedly brought the lake's plight to national consciousness. But Staniek, who formed the group Save Windermere, added that it was just the beginning of the mission to save the lake.
He said he wanted to see an end to sewage releases into Windermere, something that has been achieved elsewhere in the world, including at Lake Annecy and Lake Geneva.

Dundee maritime attraction gets £3.55m funding boost

Discovery Point, a popular Dundee tourist attraction exploring the city's maritime history has been awarded £3.55m for the next stage of its redevelopment. The attraction includes Captain Scott's Antarctic exploration ship RRS Discovery, which is currently undergoing a major restoration project. The Heritage Fund money will also go towards two new exhibition galleries and a restaurant in its visitor centre.
Dundee Heritage Trust said it hoped the funding would help secure the ship's future as "one of the world's most-important historical vessels".
Last year the Hope Cross, a poignant memorial to polar explorer Sir Ernest Shackleton from his crew, went on display at Discovery Point after a journey of more than 7,000 miles from the South Atlantic.
The new exhibitions will shed light on the early explorers' fascination with Antarctica and how Discovery's pioneering voyages continue to shape global climate science.

Five people survive 36 hours in swamp 'surrounded by alligators' after plane crash

Five people were rescued after spending 36 hours atop a plane in an alligator-infested swamp in the Amazon after it was forced to make an emergency landing. The small plane was found by local fishermen in Bolivia's Amazonas region. The survivors - three women, a child and the 29-year-old pilot - were rescued in "excellent condition", Wilson Avila, director of the Beni Department's emergency operations centre, said.
A search and rescue mission was launched after the plane disappeared from the radar of the Beni Department in central Bolivia.
The pilot told local media that an engine failure had prompted an emergency landing near the Itanomas River during a flight from Baures in northern Bolivia to the city of Trinidad. Andres Velarde said that the plane had suddenly started to lose altitude, and he had been forced to land the craft in a swamp near a lagoon.
The five that had been on board stood on top of the plane and were "surrounded by alligators that came within three metres of us". Velarde added that he believed petrol leaking from the plane had kept the predators at bay. They also saw an anaconda in the water, he said. While awaiting rescue, they ate local cassava flour one of the passengers had brought. "We couldn't drink water, and we couldn't go anywhere else because of the alligators," Velarde said.
After fishermen discovered the craft, a helicopter was sent to transport the survivors to hospital.

Toad makes comeback at national park

The natterjack toad, the UK's loudest amphibian, has made a "remarkable comeback" at a national park following a conservation project. A total of 28 toadlets were recently counted at Blackmoor, Hampshire, in the South Downs, following the reintroduction programme, which started in 2021. It is the first time natterjack toads have been recorded breeding at the site in 50 years.

The toad, which has a distinctive rasping call that can be heard up to a mile away, had previously only been found on a single site in the national park at Woolmer Forest. In neighbouring Sussex, it is considered locally extinct.

The Amphibian and Reptile Conservation (ARC) charity has led work to provide new suitable territory for the toads. This included creating shallow ponds and restoring heathlands for the introduction of cattle grazing to create "perfect conditions" for them to return.

Olivia French, heathlands project team leader for the park, said it was a "wonderful success story for nature recovery" that shows "wildlife can thrive if given half a chance". The future for natterjack toads was "certainly looking brighter than it was", she said, with a breeding population at Woolmer and now Blackmoor as well. "This area is the last heathland bastion for this iconic species and extending their habitat range is a big step forward in stopping the species becoming locally extinct," she added.

Male Natterjack toad (Epidalea calamita) singing

Bug splat survey reveals 'alarming' decline

The Bugs Matter survey, led by Kent Wildlife Trust and invertebrate charity Buglife, runs from 1 May to 30 September each year and sees "citizen scientists" record the number of bug splats on their vehicle number plates after a journey.

The results from 2024 found the number of flying insect splats recorded across the UK had fallen by 63% since 2021. Ireland was not included in last year's survey but will take part this year.

Dr Lawrence Ball, from Kent Wildlife Trust, said the decline could perhaps be linked to "the extreme climate in the UK in recent years".

Insects play a vital role in the ecosystem by pollinating crops, providing natural pest control, decomposing waste and underpinning food chains that support birds, mammals, and other wildlife.

Bug splats declined 8% in 2024, following sharper drops of 44% in 2023 and 28% in 2022. Dr Ball said the slowing rate of decline shows the curve may flatten or even reverse next year.

More than 25,000 journeys have been analysed as part of the survey since 2021.

Algae warning at largest natural lake in Wales

Visitors are being warned to take extra care when visiting a popular North Wales Lake after harmful algae was found in the water.

Eryri National Park said the blue-green algae was present in parts of Llyn Tegid in Bala, Gwynedd. The authority has urged people to be careful around the lake and avoid direct contact with the algae.

Blue-green algae is a collection of microscopic organisms that are naturally present in lakes and streams which can become harmful.

Visitors are being asked to familiarise themselves with the safety notices on the foreshore, and not to enter the water when algal bloom is present.

Blue-green algae - cyanobacteria - can become abundant in warm, shallow, undisturbed, nutrient-rich surface waters that receive a lot of sunlight, leading to floating mats or scums on the water's surface. Some algae produce toxins which can cause skin rashes, nausea, eye irritation, vomiting, fever, diarrhoea and muscular or joint pain if swallowed.

It is not possible to tell if a bloom is toxic simply by looking at it. The algae can be extremely dangerous to pets, livestock and wildlife.

Ozone gas to be used to clean UK river

A water firm is using technology worth £20m for the first time in the UK to pump ozone gas into a river to reduce pollutants. Severn Trent Water is using the process on wastewater to clean up the River Teme in Ludlow, Shropshire.

It aims to reduce bacteria, micro pollutants and medications in the water, along with viruses by using the ozone plant on the river.

A stretch of the river was granted bathing water status last year, but the water quality was later designated as poor because of high E. coli levels from sewage and agricultural run-off during floods.

Severn Trent Water said while their current process ensures pollutants are reduced, it does not take out all the bacteria and pharmaceutical chemicals.

While the technology has been used on drinking water before, this will be the first time it has been used on wastewater. The ozone gas will be used at the end of sewage treatments before water is returned to the river to provide an "enhanced" process, Severn Trent said.

UK sea temperatures soar after exceptionally warm spring

Temperatures in the seas around the UK and Ireland soared in mid-May, with some areas now 4°C warmer than normal, with potential implications for marine life and people going swimming. The heatwave is most intense off the west coast of Ireland as well as pockets off the coasts of Cornwall and Devon, according to scientists at the National Oceanography Centre and the Met Office.

Sea temperatures in April and the first half of May were the highest recorded during those months since monitoring began 45 years ago. Scientists expect 2025 to be one of the hottest years on record for air temperatures.

The entire west coast of the UK is now about 2.5°C above average. A large portion of Scottish waters are 2-3°C warmer than usual for the time of year. In one location, just off Tyne and Tees, temperatures are 5°C higher than average, according to the Centre for Environment, Fisheries and Aquaculture Science.

The worst impacts on species are likely to have been avoided for now because the temperatures have not gone above the upper limit that marine life can tolerate. However, it may be disrupting species' breeding patterns and could bring an influx of jellyfish that like warmer waters, including the huge barrel jellyfish, to seas and beaches. It could also cause harmful algae to grow out of control, creating wide patches of green algae that can poison other life.

US halts construction of giant wind farm off New York coast

The Trump administration has halted construction of a vast wind farm off the coast of New York, which was designed to provide enough electricity to power 500,000 homes.

Interior Secretary Doug Burgum said the Biden administration had "rushed through" the approval of the Empire Wind 1 project "without sufficient analysis".

This is a major blow to the US wind industry, which was championed by former President Joe Biden - but has been targeted heavily by President Trump. In the days after his return to office, Trump signed a series of executive orders aimed at the industry - including a temporary freeze on federal permits and loans for offshore and onshore wind projects.

"We're not going to do the wind thing," Trump said at the time, calling them "big, ugly windmills" that were dangerous to wildlife.

Equinor, the Norwegian company that is leading the Empire Wind project, said in a statement: "We have decided to stop offshore construction of the project following the order. We will engage with the administration to find out why the order was issued after we had received all the permits previously." Equinor acquired a lease of the site from the federal government in 2017 and, according to its website, the project was set to deliver 810 MW of energy into Brooklyn, powering 500,000 homes.

Trump has previously claimed, without evidence, that wind turbines kill whales!

South West Water halved storm overflow spills in North Molton

South West Water halved storm overflow spills in North Molton last year after adding new storm water storage to its local wastewater treatment works. North Molton, a village parish located in North Devon, recorded 202 storm overflow spills across the year in 2023. Thanks to the improvements by South West Water, that number dropped by over 50% in 2024.

The new reinforced concrete storm water storage tank is running alongside the existing storage, providing extra capacity during periods of heavy rainfall. This allows the treatment works to store more flows during wet weather to relieve pressure on the site and prevent storm overflow spills from happening. When the rain stops and the flows have reduced, the tank then releases what it has stored back into the system to be treated at the treatment works.

Jay Harris South West Water's Director of Wastewater Operations, said: "It's so rewarding to see the number of storm overflow spills at North Molton treatment works dropping so much despite last year being the wettest hydrological year on record. "Our teams are as passionate about reducing storm overflows as our customers are and, through examples like this one, we are making real progress."

The improvements are just one example in a wider plan to reduce storm overflows and improve water quality across the region. In 2024 South West Water was one of only five companies in the industry to reduce spills compared to 2023. South West Water will plan more work in the area as it works to become the first water company to meet the Government's target of less than 10 spills a year per overflow by 2040 - 10 years ahead of the deadline.

Sandeel fishing ban to remain in place

A challenge to Britain's ban on commercial fishing for sandeels in the North Sea, by the European Union (EU), has been dismissed in an international court.

Sandeels are a vital source of food for marine life including seabirds that live along the UK coastline. Two bans for English and Scottish waters were put in place in early 2024 to prohibit trawlers netting the tiny fish, following concerns that sandeel stocks were becoming too low.

Judges at the Permanent Court of Arbitration (PCA) based in The Hague ruled there is no legal obligation to reverse the closure order after the EU claimed the move was "discriminatory and disproportionate" and could threaten the future of commercial sandeel fishing in Denmark.

The Royal Society for the Protection of Birds (RSPB), which manages Bempton Cliffs in East Yorkshire, was one of several conservation organisations that called for the measure to remain in place and gave evidence in the court hearing. Beccy Speight, the RSPB's chief executive, said: "We are absolutely delighted the panel has found the ecological case for the closure of industrial sandeel fishing is sound. Safeguarding sandeel stocks is a key part of the jigsaw that will help set our puffins, kittiwakes and the wider marine environment on the path to recovery."

The Department for the Environment, Food and Rural Affairs (Defra), welcomed the court's decision and said it had found "the UK successfully demonstrated that the measures taken to close English and Scottish waters were based on the best available science."

Massive icebergs once roamed off coast of UK

A new study reveals there was a time when massive icebergs, like the ones we see in Antarctica today, were drifting less than 90 miles off the UK coastline. Scientists have for the first time discovered the distinctive plough-marks these spectacular giants carved as their undersides dragged across the floor of the North Sea, off the east coast of the UK, some 18,000 to 20,000 years ago.

This was during the last ice age, a period when an ice sheet covering much of the British and Irish Isles was retreating due to a warming climate. The new research is published in the journal *Nature Communications*.

Deep, comb-like grooves — hundreds of metres wide — have been preserved in the sediments buried beneath the present-day seafloor. They are visible in seismic survey data that was used to locate sites for drilling platforms in the Witch Ground Basin, situated between Scotland and Norway. From the size of the parallel grooves, researchers can estimate the dimensions of the icebergs responsible.

"We're talking about enormous flat-topped, or 'tabular', icebergs," explained marine geophysicist Dr James Kirkham from the British Antarctic Survey (BAS). "Conservatively, they measured five to perhaps a few tens of kilometres in width — comparable to the area of a medium-sized UK city such as Cambridge or Norwich — and could be a couple of hundred metres thick."

Single grooves made by the narrow keels of small bergs have been observed before, but the broad Witch Ground tramlines are the first clear evidence that monster blocks of ice were also roaming across the North Sea.

Ofwat to water companies' message

Regulator Ofwat has written to water companies telling them to build new reservoirs and other major projects more quickly in the coming years.

In a letter to water company bosses, the watchdog said they must find ways to "deliver (projects) more efficiently, effectively and achieve earlier completion."

Ofwat chief executive David Black wrote: "We are asking you to consider your major projects or programmes of projects and assess how you can accelerate work and/or gain benefits from optimising, development and construction."

Water firms have been the subject of growing outrage among MPs and campaign groups in recent years, amid rising consumer bills, vast quantities of sewage pollution. and bonus payouts to top executives.

Ofwat recently approved a sharp increase in bills across most parts of the sector, which it said should help firms invest in their pipes and sewers and reduce pollution and outages.

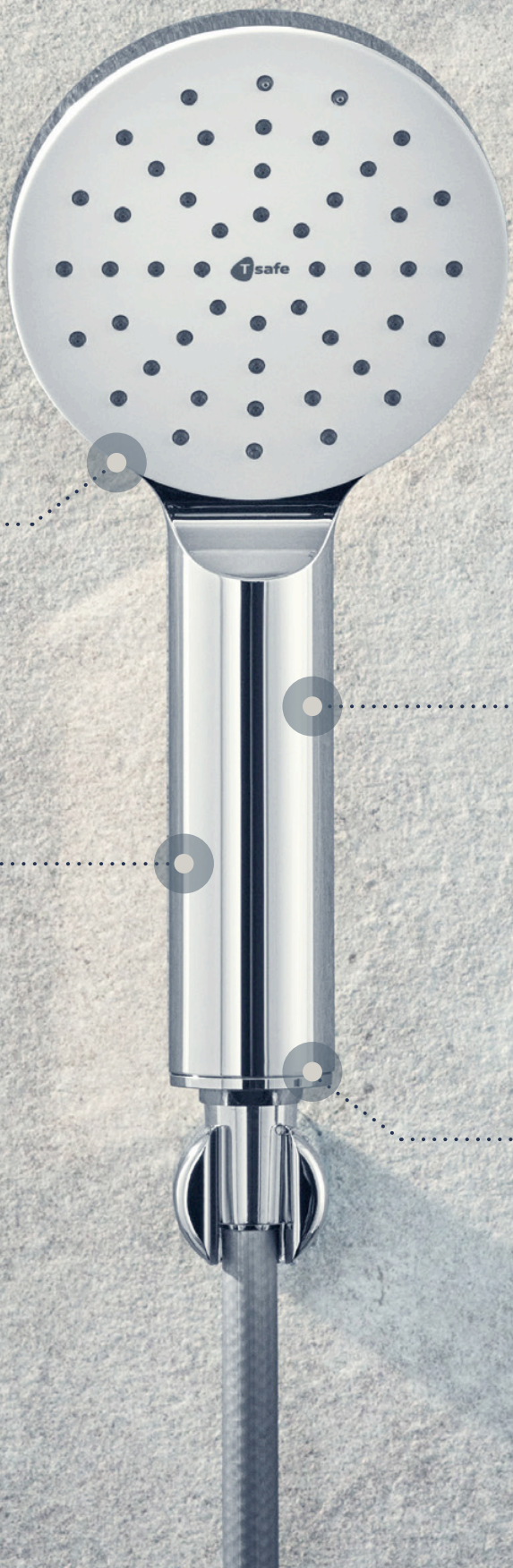
Ofwat allowed companies to raise average bills by 36%, or £157 in total, over the next five years, to £597 by 2030, to help finance a £104 billion upgrade for the sector.

There are 30 major projects planned across England and Wales in next 15 years, including nine reservoirs. The last time a major reservoir was built was more than 30 years ago.

Cheddar Reservoir, Somerset, England

Aegis Hand Shower Filter

NEW



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Zero-Emission Double-Decker Buses Arrive in Plymouth

The first of fifty zero-emission electric double-decker buses have now arrived in Plymouth, marking a major shift toward cleaner, more sustainable public transport.
The buses are part of a transformative project led by Plymouth Citybus, part of the Go-Ahead Group, in partnership with Plymouth City Council, Cornwall Council, and the Department for Transport. The initiative will replace almost half of the Plymouth Citybus fleet with brand-new electric vehicles.
The first bus arrived on 22nd April and deliveries have continued steadily since then, with more due over the coming weeks, prior to the buses entering service this summer.
The electric buses will operate on Plymouth routes 21/A, 42, and 50/51, with six vehicles also serving the Rame Peninsula in Cornwall on route 70. The full fleet of 50 buses is scheduled to be on the road by the end of the year.
To support the electric buses infrastructure work is progressing rapidly and the transformation of the Milehouse depot into a state-of-the-art hub for charging and maintaining the electric fleet is on track for completion this summer, thanks to the investment by the project partners.
The project is being primarily funded by Plymouth Citybus, part of the Go-Ahead Group, contributing £19.6 million, supported by a £10.34 million grant from the Government's Zero Emission Bus Regional Area (ZEBRA) 2 Fund, with additional contributions of £1.94 million from Plymouth City Council and Cornwall Council.
The new buses are expected to reduce carbon emissions by 79,914 tonnes over their lifetime, as well as reducing NOx (nitric oxide and nitrogen dioxide) emissions by 28 tonnes, and PM (particulate matter) 2.5 emissions by one tonne.

Impacts of mixed microplastics on marine life

An innovative study indicates that a mixed microplastic blend may be substantially more toxic than a single polymer on a key marine food-web species.
Due to the wide range of ways in which microplastics can enter the natural environment, microplastic pollution is extremely diverse in terms of material make-up, size, shape, chemical composition, colour, and state of degradation. This diversity causes challenges not only for marine life but also for scientific studies.
To help address these challenges in monitoring and experimentation a team of scientists from the UK and Norway adapted existing experimental methods to conduct full and partial life-cycle, mixed-microplastic toxicity tests on the adult and juvenile stages of the ecologically important copepod Acartia tonsa.
Marine copepods play a critical role in the global ocean, supporting food webs, and contributing to fisheries productivity, nutrient flux and carbon sequestration. Given their ecological importance, global distribution and high abundance, sensitivity to environmental stressors and ease of culturing, copepods are recommended as valuable model organisms for toxicological testing.
The researchers tested how mixed plastics affected the creatures in various ways, including their survival, how much they ate, and how well their eggs and young ones developed. They discovered that the mixed plastics caused more harm, including a high death rate at certain concentrations. Dr Zara Botterell, who led the study, said the new information was crucial for understanding the risks and setting safety limits for plastic pollution. *Full paper: Acute and partial toxicity of a tri-polymer blend of microplastics in the copepod Acartia tonsa.*

Copernicus: Second-warmest April globally

The average temperature over European land for April 2025 was 9.38°C, 1.01°C above the 1991-2020 average for April, making it the sixth-warmest April for Europe. Temperatures were predominantly above average across Europe, with the largest warm anomalies recorded over eastern Europe, western Russia, Kazakhstan, and Norway, while colder-than-average temperatures occurred across Türkiye, eastern parts of Bulgaria and Romania, the Crimean Peninsula, and northern Fennoscandia.
Outside Europe, temperatures were most above average over the Russian Far East and in a large part of west-central Asia. They were also above average over most of North America, part of Australia, and across the Antarctic Peninsula and West Antarctica. Temperatures were most below average over southern South America, in eastern Canada in the Great Lakes region and over the Hudson Bay, across northeastern Greenland and Svalbard and over northern Australia and east Antarctica.
The average sea surface temperature (SST) for April 2025 over 60°S–60°N was 20.89°C, the second-highest value on record for the month, 0.15°C below the April 2024 record. SSTs remained unusually high in many ocean basins and seas. Among them, large areas in the northeast North Atlantic continued to show record-high SSTs for the month. Most of the Mediterranean Sea was much warmer than average, but not as record-breaking as in March.
Arctic sea ice extent was 3% below average, the sixth lowest monthly extent for April in the 47-year satellite record, following four months with record low monthly values for the time of year. Regionally, below-average sea ice concentrations were most pronounced in the Barents Sea and Sea of Okhotsk while above-average concentrations prevailed in the Greenland Sea. Antarctic sea ice extent was 10% below average, making it the 10th lowest on record for the month.
In April 2025, much of central Europe, Great Britain, southern Fennoscandia and part of eastern Europe experienced drier-than-average conditions. Conversely, it was predominantly wetter than average in most of southern Europe, northern Norway, southern Finland and parts of western Russia. The Alpine region saw heavy precipitation leading to floods, landslides and avalanches. In April 2025, it was drier than average in much of western North America, across central and easternmost Asia, as well as most of southern Australia, Madagascar and parts of South America. Wetter-than-average conditions were seen in parts of Canada and Alaska, mid-west USA, in parts of easternmost and central Russia, southern Africa, northern Australia and central South America. In many of these regions heavy precipitation led to floods and associated damage.

Brewery aims to reduce waste by 80%

A brewery firm has launched a scheme to reduce the general waste in its 45 managed pubs by 80%. St Austell Brewery, Cornwall, launched the initiative in partnership with Biffa, a waste management company. There are aims to double the amount of waste being recycled as part of the plan and to hit the 80% target by the end of the year.
All St Austell Brewery's managed pubs have colour-coded bins which are divided into three sections: dry mixed recycling, food waste and general waste. The brewery said it would educate colleagues on correct recycling and is rolling out a supporting employee encouragement plan to help drive engagement and participation. It said this included a leaderboard for pubs, where the team with the highest reduction in waste overall would be rewarded with online vouchers to spend every quarter.
In 2024 St Austell Brewery successfully reduced total waste by 40%.

Sending sunlight back to where it comes from and 20 other ideas

The United Kingdom's high-risk research agency will fund £56.8 million worth of projects in the controversial area of geoengineering — manipulating Earth's environment to avert negative effects of climate change. The 21 projects include small-scale outdoor experiments that will attempt to thicken Arctic Sea ice and to brighten clouds so that they reflect more sunlight. The hope is that successful technologies could one day contribute to efforts to prevent the planet from passing dangerous climate tipping points.

Supported by the Advanced Research and Invention Agency (ARIA) as part of its five-year Exploring Climate Cooling programme, the projects are among the most significant geoengineering experiments funded by a government.

The research has the potential to be beneficial, but must be undertaken cautiously, says Peter Frumhoff, a science-policy adviser at the Woodwell Climate Research Center in Falmouth, Massachusetts. "I am strongly supportive of responsible research on solar geoengineering and other climate interventions," he says.

Mark Symes, an electrochemist at the University of Glasgow, UK, who leads the Exploring Climate Cooling programme says the programme's goal is not to find ways to replace more accepted approaches to tackling climate change, such as reducing carbon emissions. Instead, he says, geoengineering could be useful to prevent the world reaching certain tipping points that might occur before emissions reductions can have an effect. That could include "the collapse of circulations in the North Atlantic driven by the runaway melting of the Greenland ice sheet," he says.

But even as climate change continues unabated, the concept is controversial: last year, researchers at Harvard University in Cambridge, Massachusetts, cancelled a project that would have introduced particles into the atmosphere in an effort to 'dim' the Sun after an outcry in Sweden, where the experiment was to take place.

Campaigners demand a ban on destructive fishing in protected areas

Leading ocean organizations – including Seas At Risk, BLOOM, Oceana, EarthEcho International, Rise Up and The Transform Bottom Trawling Coalition – took part in a Week of Ocean Action (24-30 March) to demand an immediate ban on destructive fishing practices such as bottom trawling in Europe's marine protected areas (MPAs).

This coincided with the release of two major new studies, which show the unacceptable impacts of bottom trawling and demonstrate the feasibility of a transition away from trawling. The study by National Geographic Pristine Seas shows that bottom trawling results in a net cost to European society of up to €11 billion every year. The study by BLOOM and French researchers from L'Institut Agro and the French Natural History Museum shows that trawling has the worst social-ecological footprint of all fishing methods: the passage of French bottom trawlers impacts 670,000 km2 of seabed each year, a surface larger than France itself.

The Week of Ocean Action built on a 200,000-strong public petition and brought together a broad coalition of NGOs for a series of events and initiatives designed to build momentum ahead of the SOS Ocean Summit in Paris (30-31 March). By uniting advocacy efforts, the campaign will push for major commitments on marine protection ahead of the landmark UN Ocean Conference taking place in Nice this June. A coordinated citizen action will call on EU countries and the UK to take urgent steps to ban bottom trawling in MPAs.

Coastlines in danger even if climate target met

The world could see hugely damaging sea-level rise of several metres or more over the coming centuries even if the ambitious target of limiting global warming to 1.5°C is met, scientists have warned. Nearly 200 countries have pledged to try to keep the planet's warming to 1.5°C, but the researchers warn that this should not be considered "safe" for coastal populations.

They drew their conclusion after reviewing the most recent studies of how the ice sheets are changing - and how they have changed in the past. However the scientists stress that every fraction of a degree of warming that can be avoided would still greatly limit the risks.

The world's current trajectory puts the planet on course for nearly 3°C of warming by the end of the century, compared with the late 1800s, before humans began burning large amounts of planet-heating fossil fuels. That's based on current government policies to reduce carbon emissions from fossil fuels and other polluting activities. Even keeping to 1.5°C would still lead to continued melting of Greenland and Antarctica, as temperature changes can take centuries to have their full impact on such large masses of ice, the researchers say. "Our key message is that limiting warming to 1.5°C would be a major achievement - it should absolutely be our target - but in no sense will it slow or stop sea-level rise and melting ice sheets," said lead author Prof Chris Stokes, a glaciologist at Durham University. The paper is published in the journal *Communications Earth and Environment*.

A summer of supersized strawberries

S&A Produce, the UK's biggest independent strawberry grower, has stated that the recent weather has been 'phenomenal' for the berries.

A dull and cold March has allowed plants to develop strong root systems, while subsequent April and May sunny and warm days with cooler nights have allowed berries to adsorb energy without being 'overstressed' by the heat.

The company added that the cold weather gives flavour to the strawberries, and the sunshine gives us much bigger berries.

Strawberries are also being bred to match consumer tastes, including size. This year's crop will yield berries of around 45g on average, up from a more usual weight of 25g.

UK drought warning

Many of the UK's rivers have hit exceptionally low levels and that could worsen in the next three months, according to the Centre for Ecology & Hydrology (CEH), raising questions over supplies to households, farmers and businesses.

The mid-May warning comes after the driest spring in England since 1961, with northern regions experiencing the driest start to the year in nearly a century. Almost all of the UK is expected to have below normal or low river levels in May, apart from the south-west of England and South Wales. The forecast to the end of May, is blue sky, little or no rain, and above average air temperatures, for most areas.

The Environment Agency has said that the UK is at medium risk of drought and warned households of the risk of water restrictions.

The next 2-3 weeks will be "crucial" in determining whether the country goes into drought, says Mark Owen, head of fisheries for the Angling Trust and a member of the National Drought Group. That is the committee, led by the government, which declares if and when a drought is officially under way.

The country is not now in drought, but the impacts of the exceptionally dry weather are already being felt.

Some farmers are being forced to water their crops instead of relying on rainfall, which is something that normally happens later in the year.

There is a warning that an extremely long drought would mean farmers struggle to produce food, and more produce would need to be imported.

The dry and sunny weather this year has led to a larger area of the UK burned by wildfires this year compared to in any other entire year.

Thames21 reiterates call for government to speed up introduction of legislation to ban plastic in wet wipes

Environmental charity Thames21 has reiterated its call for the government to swiftly announce a date when it will introduce legislation to ban plastic in wet wipes to prevent them from ending up in the River Thames and its tributaries. The previous government, under former Prime Minister Rishi Sunak, announced that it would introduce legislation to ban plastic in wet wipes in April. However, the current government has not set a timetable for introducing this new law.

The call came ahead of Thames21's 'Big Wet Wipe Count' citizen science event, which took place by Hammersmith Bridge on Wednesday 30th April.

Wet wipes make their way into rivers and seas after being flushed down the toilet and sewage overflows dump them into the water. Once in the sewage system, they cause blockages and lead to sewage spills. Commonly, sewage-derived wet wipes contain plastic fibres that prevent them from biodegrading. As they accumulate on slow-moving parts of rivers, they create artificial islands harming wildlife and impacting water quality.

Wet wipes that contain plastic can take many years to biodegrade, breaking down into microplastics with time. These tiny particles are ingested by wildlife, spreading across the food chain and harming entire ecosystems.

Thames21's Liz Gyekye said: "Together with our volunteers, we have collected more than 142,000 wet wipes from the Thames foreshore since 2017. Working together with our volunteers and partners, we were able to use this data to lobby the previous government to commit to introducing legislation to ban plastic in wet wipes last year. The River Thames has been London's main artery for centuries, but this artery is facing many pressures, including sewage-derived wet wipes. These wet wipes have been harming the Thames, its wildlife and surrounding ecosystems for many years, harming wildlife and impacting water quality." Wet wipes make their way into rivers and seas after being flushed down the toilet and sewage overflows dump them into the water. Once in the sewage system, they cause blockages and lead to sewage spills. Commonly, sewage-derived wet wipes contain plastic fibres that prevent them from biodegrading. As they accumulate on slow-moving parts of rivers, they create artificial islands harming wildlife and impacting water quality.

Lack of Rainfall in spring in England

United Utilities is aiming for reduced water consumption in 2025 and beyond, with commitments to decrease leakage, household water use, and business water use. Specifically, they aim to reduce leakage by 13%, household water use by 5%, and business water use by 7% during the 2025-30 period, according to Ofwat.

Across England it has been the driest start to the year since 1956 and, as the recent warm and prolonged dry weather continues into mid-May, the North West region's water supplier United Utilities is asking everyone to help use water wisely as it ramps up its own operational activities to manage water resources.

The lack of rainfall has led to lower than usual reservoir levels with regional reservoir levels being 69% full, compared to over 90% this time last year, (mid-May). The company is working hard behind the scenes to make the best use of its water resources. This includes using its vast interconnected system of treatment works and pipes to move water from one part of the region to another to 'top up' areas that are lower and tackling leaks.

United Utilities has also recorded its lowest levels of leakage across the North West and in the last year has increased its find and fix rates by 70 per cent. There are now 100 teams working around the clock fixing over 800 leaks a week, saving over 3.5 million litres a day.

First step to restore Sussex's coast

Work has begun to restore 160km of coastline after the Sussex Bay project received funding worth more than £1m. The scheme will see the marine environment and rivers from Chichester to Camber Sands undergo a programme to accelerate their recovery from pollution and overuse.

Work is currently being carried out to create an artificial 'reef wall' and 'wildlife corridors'. The 'reef wall' is currently being constructed at Shoreham Port, where officials are working with fishing communities to become more sustainable.

Tom Willis, chief executive of the port, said: "I believe Sussex Bay can restore fish stocks in the area and we've just opened our brand new in-shore marina to ensure that in-shore fishing, the most sustainable kind of fishing, is protected for many years to come."

Sources of the £1m funding include the Marine Management Organisation, Natural England, Innovate UK and Championing Coastal Communities. The project is working with local councils, ports and universities, who are conducting research on the marine environment.

After a reduction in pollution and an increase in fish was noted, it is hoped the area will also see more larger marine animals returning to the area. The project is working with local councils, ports and universities, who are conducting research on the marine environment.

Starlings disappearing from gardens, says RSPB

Fewer starlings are visiting UK gardens, according to the conservation charity, the RSPB. It says its Big Garden Birdwatch, which took place over the last weekend in January, recorded the lowest number of starlings since the survey began in 1979. Starlings are common garden visitors, but one of the UK's fastest disappearing birds, with a sharp population decline since the 1960s. They are known for their spectacular winter acrobatics, flying in huge flocks or murmurations.

RSPB chief executive, Beccy Speight, said though this year's results are a reason for concern, "we can all do our bit to support these threatened birds".

Emma Marsh, RSPB's executive director said small actions in people's gardens can benefit starlings and other wildlife. These include avoiding pesticides, which reduce the number of insects around that starlings eat; having a mix of short and long grass to help starlings watch out for predators; keeping lawns natural with dandelions and clovers so there would be more invertebrates; and putting up nest boxes.

Almost 600,000 people across the UK took part in The Big Garden Birdwatch this year, counting more than nine million birds over the course of an hour in their garden or local park. Prior to the year 2000, the starling was regularly the most numerous species recorded in the survey. This year it dropped from third to fourth place behind the house sparrow, the blue tit and the wood pigeon. The blackbird remained in fifth place.

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event report

WMSoc webinar - LRA Executive Summaries and Written Schemes

Webinar delivered on Friday 9th May 2025

The Water Management Society held a webinar entitled LRA Executive Summaries and Written Schemes on Friday 9th May 2025. The webinar was presented by Colin Shekleton, WMSoc Director and LCA Assessor, and was chaired by Matt Morse, LCA Manager, who also hosted the Q&A.

The webinar, which gave an insight into what makes a good risk assessment and written scheme, began with a brief introduction by Matt to the over 110 people in attendance. Matt then handed over to Colin for the main presentation. Colin began with explaining what executive summaries are, and what they should include. He highlighted the importance of these complying with the correct guidance, the duty of a sufficient risk assessment, scope of assessment, and all other elements of executive summaries, as well as touching on the use of emerging technologies such as AI.

Colin then moved onto written schemes, where he spoke about the ACOP L8 guidance and its application, focusing on the critical paragraphs of 59 and 60. Importantly, Colin defined that a written scheme is not just a 'simple task matrix of water hygiene tasks of who does what and when', he instead clarified that it should be a manual that sets out the various control measures and how to carry them out. He also highlighted the WMSoc guidance, 'Guide to Legionella Risk Assessment', which can be found on the WMSoc website.

A recording of the webinar, and a transcript of the Q&A, are now available on the members area of the WMSoc website. Please note that CPD points are not awarded for watching the webinar recording, but 1 CPD point was awarded to all those attending the live event.

Thank you to Oculus Consulting, Clearflow Water Treatment, and RemoteTech for sponsoring the webinar.

Our next webinar, titled 'The Management and Control of Waterborne Bacteria in Primary Care Dental Practices', will be a presented on 19th September 2025 by WMSoc Events Committee member Kimberly Arbuckle. The webinar is available to book on the WMSoc website now.

Legionella longbeachae: An emerging pathogen in northern Europe

P0925

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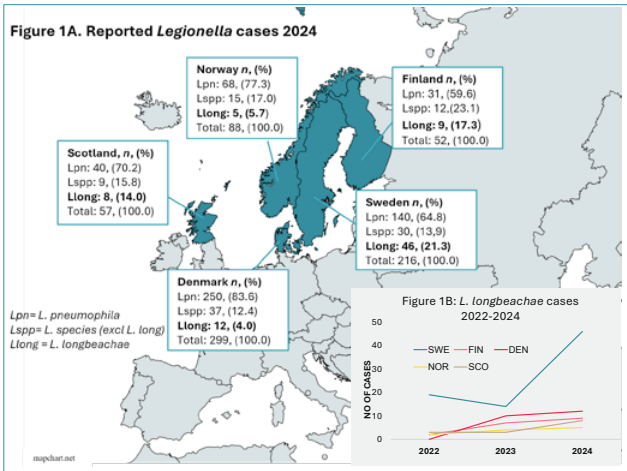

Figure 1. Geographic distribution of *Legionella* cases in Scandinavia and Scotland in 2024. Panel A shows all cases in 2024 and panel B *L. longbeachae* cases 2022-2024.

Key messages

Increase in *L. longbeachae* cases (Figure 1):

- In 2024, Sweden reported an increased from 14 (2023) to 46 (2024) cases – a trend not seen for other *Legionella* spp.
- Norway, Denmark, Finland and Scotland also reported an increase, constituting between 4 and 17.3 % of total legionella cases in 2024.

New diagnostic methods (Figure 2):

- The sharp rise in *L. longbeachae* cases in Sweden from 2023 to 2024 is likely due to both an increase in cases and the introduction of a specific PCR.

Seasonal variation (Figure 3, Table 1):

- Most cases (75/144, 52%) were reported between June and August.
- Handling of compost/bagged soil/potting mix were commonly reported.

Background

Legionella can cause Legionnaires' disease (LD), a severe form of pneumonia and a milder flu-like infection, Pontiac fever. Also, extrapulmonary infections are increasingly reported (1). Many countries primarily report cases of *L. pneumophila* due to the widespread use of *L. pneumophila* Urinary Antigen Tests (UAT). *Non-pneumophila* species are underdiagnosed and underreported because lower respiratory tract samples are often not collected or investigated by PCR.

Method

Data from all *Legionella* cases reported to the national surveillance system in Sweden, Denmark, Finland, Norway and Scotland 2022-2024 were collected including diagnostic method, source investigation, age and gender of the patient.

Patient characteristics

- 144 cases of *L. longbeachae* infections
- 62.5% (*n*=90) of patients were men
- Median age was 71 years (range 27-95 years)

Diagnostic methods

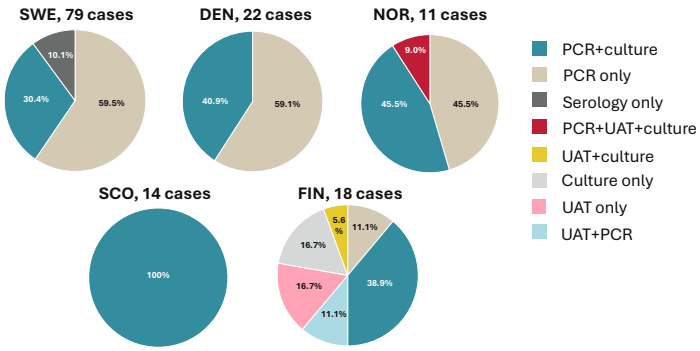

Figure 2. Diagnostic methods used for identifying *L. longbeachae* 2022-2024.

- PCR alone or together with cultivation identified most cases. A strain was isolated for 67/144 cases (46%).
- In Sweden, the rise in *L. longbeachae* cases is partly due to a new *L. longbeachae* specific PCR established at the two largest clinical microbiological laboratories (June 2021 and May 2024).
- In Denmark and Norway, most cases were screened with *L. species* PCR and identified as *L. longbeachae* with PCR at the National Reference Laboratory.
- In Scotland, all cases were found by *L. species* PCR and cultivation.
- Norway and Finland diagnosed several cases using UAT that include *L. longbeachae*.

Seasonal variation

Most cases were reported during the summer period (June-August) when gardening is a common leisure activity.

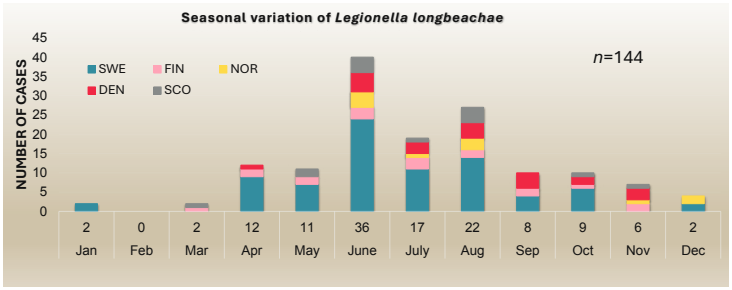

Figure 3. Seasonal variation of *L. longbeachae* cases 2022-2024 in selected countries.

Source investigations

- It is difficult to identify the environmental source since it requires sampling from polymicrobial substrates (compost/bagged soil/potting mix).
- Yet, matching strains were successfully identified with WGS in Denmark and Finland (2) as shown in Table 2.
- In Sweden and Scotland no source investigations were carried out due to learnings from previous outbreak investigations (3).

Table 2. Source investigation of *L. longbeachae* cases in 2022 to 2024. WGS = Whole Genome Sequencing.

	SWE	FIN	DEN	NOR	SCO
***L. longbeachae* patient cases**	79	18	22	11	8
Clinical isolates	24	13	10	6	8
Direct contact w soil/potting mix or indirect via gardening	57	15	10	3	8
No/unkown contact	22	3	12	8	0
Enviromental investigation done	0	17	7	2	0
***L. longbeachae* environmental isolates**	N/A	8	5	1	N/A
Matching strains by WGS	N/A	2*	1#	0	N/A

* Core Genome Multilocus Sequence Typing (CgMLST), # Single Nucleotide Polymorphism (SNP) analysis

Conclusions

- Non-*pneumophila* species caused 20-40 % of legionella infections in 2024.
- *Legionella* diagnostics should include *L. longbeachae!*
- We need to raise awareness of *L. longbeachae* among medical personnel and commercial/private gardeners for faster diagnosis, treatment and prevention.
- Source investigations are complex but can help us understand more about the natural habitats of *L. longbeachae*.

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Further reading

1. Frostadottir *et al.*, 2023. Front Cell Infect Microbiol 2023 Apr 26:13:1178130. doi.org/10.3389/fcimb.2023.1178130
2. Mentula S *et al.*, 2025. Diagn Microbiol Infect Dis. 2025 Mar 6;112(2):116788. doi: 10.1016/j.diagmicrobio.2025.116788.
3. Löf E *et al.*, 2021. Euro Surveill. 2021 Feb;26(7):1900702. doi: 10.2807/1560-7917.ES.2021.26.7.1900702.

New Fellowships awarded

At this year's AGM we awarded two Fellowships to the Society to Bob (Robert) Wilson and Gary Sewell for their significant contributions to the industry. In addition, Susanne Surman-Lee was awarded an Honorary Fellowship to recognise her exceptional contribution to both the WMSoc and the industry as a whole. We congratulate Bob, Gary and Susanne and learn a little more about them.

Bob Wilson

Vicki Morrison collects Bob Wilson's award.

Bob has always been ahead of his time in the water treatment industry. He started his career at BP chemicals in Grangemouth after graduating from Strathclyde University in 1969. During his 16 years at BP, he became Water Treatment Consultant for the BP Chemicals Group in Europe. Then he worked briefly at Houseman and H & G consultancy in Glasgow before deciding to start his own water treatment company.
At its height Deveron was the biggest water treatment company in Scotland dealing with both clean and wastewater treatment. During his time at Deveron Bob installed the first chlorine dioxide dosing systems in the UK at Edinburgh Royal Infirmary.

Bob has always been driven by innovation and when he discovered Huwa-San, which was originally used to keep chicken drinking water bacteria free, he knew it could be a great product for legionella control. He introduced silver peroxide to the legionella control market in the UK and the rest of the world. He has also invented Delta-T whilst working with University of West of Scotland (UWS). Delta-T significantly improves the energy efficiency of closed systems reducing energy usage and carbon emissions. Prior to this he invented Endotherm.

Bob has also been an expert witness in 25 cases including two international ones in the last 20 years.

When contacted about the award Bob said "Having spent most of my working life working in the backwaters of the water treatment industry it was a great surprise and honour to be awarded a Fellowship of the Water Management Society." Due to Bob's poor health his daughter Vicki Morrison proudly attended the AGM to accept his certificate.

Gary Sewell

Gary joined us at our AGM to accept his certificate and had this to say, "I'm honoured to have been awarded a Fellowship, recognising a career that began over 35 years ago when Legionella control was still emerging."
Starting as a technician in 1988, Gary has been fortunate to witness the transformation of our industry, technically, culturally, and commercially. His journey has always been driven by a deep respect for compliance, a passion for learning, and a belief in doing things right. Joining Hydro-X in 2019 felt like a natural step, an organisation with values that mirrored his own. As Managing Director, Gary has focused on creating a culture where people thrive, where leadership is shared, and where customer trust is earned through evidence and expertise.
Gary felt that the Fellowship was not just a personal milestone, it reflected the collective effort of the teams he has worked with, the mentors who've shaped him, and the clients who've trusted him. His work in water and air hygiene has real impact, protecting health, ensuring safety, and driving standards forward.

As our industry continues to evolve, Gary remains committed to learning, leading, and contributing to the professional community that has given him so much. Noting "This recognition is humbling, and I accept it with gratitude and renewed purpose."

Susanne Surman-Lee

Susanne's first encounter with the Water Management Society was when she attended a risk assessment course way back in the mid-nineties and joined the WMSoc whilst at the PHLS Water and Environmental Microbiology Research Unit based at Queens Medical Centre in Nottingham. Susanne later served on Council for many years, and notes "if I remember rightly I was the first woman elected Council member, with the lovely Sue Pipe as the secretariat." Susanne has been involved with the Technical Committee for over 20 years including working with the team led by Graham Thompson to support the development of HSG 274 part 2 and is still supporting the Technical Committee today.

Susanne noted "I have been involved with the Water Management Society for around 30 years now and have learnt a lot from colleagues over that time. I am genuinely delighted and honoured to receive this honorary fellowship."

I am sure you will agree that all our fellows are worthy recipients and join me once again in congratulating them on their awards.

ANSWERS TO THE ARTICLE IN OUR SPRING 2025 ISSUE

A WEEK IN THE LIFE OF AN NHSSCOTLAND ASSURE AE (WATER)

Q1: Why is attendance taken at Water Safety Group meetings?

Q2: What specialist departments may provide information to a Water Safety Group?

Q3: What does SHTM stand for?

1 cpd point

A1: Water Safety Group's members are each involved for their different expertise. The WSG establishes a Water Safety Plan for eventual risk and its members are accountable for the conduct during a crisis regarding waterborne pathogens. Therefore, it is instrumental for the WSG members to attend the meetings. Furthermore, according to the point 6.28 of the HTM 4.0 Part B the attendance of water safety related training must be monitored too.

A2: All specialist departments of the healthcare provider (such as dialisis, nursing, etc.) may be asked to provide information. Meanwhile, concerns about the water pathogens should be raised to the WSG by any departments, should any risks appear. The WSG may also request more information from water contractors providing utilities on site and from the risk assessors.

A3: SHTM stands for the Scottish Health Technical Memorandum.

These are the model answers as no correct answers were received.
If you would like to get involved with this issue's CPD activity, see page 13.

Course in Brief... NEW FOR 2025!

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This one day course has been created for those planning and designing water treatment, routine sampling, testing, and inspections of closed systems. The course is also tailored to those who are considering managing their own water quality management or checking outside contractors, as well as those who have a managerial responsibility for closed systems.

Designed to give delegates an understanding of what a closed system is, how they are designed, and how the design impacts on water quality management, this course covers closed system design, problems associated with closed systems, reviewing of available standards and guidance documents, and design of water treatment and selection of products. The course will also cover selection of filtration and other equipment, importance of positive pressure and limited makeup, use and management of glycol. There will also be a discussion of example water quality reports and what they mean for which delegates are encouraged to bring water quality reports for discussion (though this is not essential).

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Legionella longbeachae and Legionellosis

Harriet Whiley [1], Richard Bentham [1]

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Abstract

Reported cases of legionellosis attributable to *Legionella longbeachae* infection have increased worldwide. In Australia and New Zealand, *L. longbeachae* has been a known cause of legionellosis since the late 1980s. All cases for which a source was confirmed were associated with potting mixes and composts. Unlike the situation with other *Legionella* spp., *L. longbeachae*–contaminated water systems in the built environment that cause disease have not been reported. Spatially and temporally linked outbreaks of legionellosis associated with this organism also have not been reported. Sporadic cases of disease seem to be limited to persons who have had direct contact with potting soil or compost. Long-distance travel of the organism resulting in infection has not been reported. These factors indicate emergence of an agent of legionellosis that differs in etiology from other species and possibly in route of disease transmission.

Keywords: Legionella longbeachae, potting mix, Legionnaires' disease, bacteria, Pontiac fever, synopsis

Legionella spp. were first identified as organisms of public health significance in 1976 and are now recognized as the causative agent of legionellosis. *L. pneumophila* was the species responsible for this initial disease outbreak and has remained the major cause of legionellosis [1,2]. The clinical manifestations of legionellosis range from no symptoms to acute atypical pneumonia and multisystem disease [2]. The term legionellosis refers collectively to the clinical syndromes resulting from *Legionella* spp. infection, i.e., Legionnaires' disease (a *Legionella* spp.–derived pneumonic infection) and Pontiac fever (an acute, self-limited febrile illness that has been linked serologically and by culture to *Legionella* spp.) [1,2]. Community- and hospital-acquired legionelloses typically are associated with water systems in the built environment, such as cooling towers, spas, showers, and other warm water systems [1,2]. Protozoa play a major role in the multiplication and dissemination of *Legionella* spp. in natural environments. The parasitism of amoebae and ciliates is well documented, and this parasitic capability is the basis of human disease through infection of human lung macrophages [1,2].

L. longbeachae was first isolated in 1980 from a patient with pneumonia in Long Beach, California, USA [3]. A second serogroup of *L. longbeachae* was discovered during the same year [4]. Neither of these reports suggested a recognized source of infection.

In Europe, *L. pneumophila* is responsible for 95% of cases of Legionnaires' disease. Of the remaining 5%, the most common causative agent is *L. longbeachae* [5]. In Australia, New Zealand, and Japan, reported cases of *L. longbeachae* infection occur as often as cases of *L. pneumophila* infection [6–8]. Within the past decade, the number of *L. longbeachae* reports has increased markedly across Europe and parts of Asia [9–15].

Potting Mixes

L. pneumophila is primarily aquatic and endemic to warm water in the built environment (e.g., cooling towers, shower heads, and water fountains) and in natural environments (e.g., rivers and lakes) [1,2]. It is transmitted from the environment through inhalation of aerosol or aspiration of *Legionella* spp.–contaminated particles [1,2]. *L. longbeachae* is rarely isolated from aquatic environments [16,17]. The primary environmental reservoir of *L. longbeachae* remains unknown; however, the major source of human infection is considered to be commercial potting mixes and other decomposing materials, such as bark and sawdust [5,8,18,19]. No reports of *L. longbeachae* infection from water systems in the built environment have been confirmed.

Recent analysis of the *L. longbeachae* genome has demonstrated that it is highly adapted to the soil environment. The genome encodes for a range of proteins that might assist in the invasion and degradation of plant material [20]. These enzyme systems are not present in *L. pneumophila*. This work supports the hypothesis of a possible environmental association with certain plant species [8,18].

The link between potting mix and legionellosis was es tablished in 1989 when a cluster of *L. longbeachae* infections was detected in South Australia. Investigations identified commercial potting mixes as the source of disease [18]. Since then, *L. longbeachae* commonly has been isolated from fresh potting mixes and some of its components but less commonly from natural soils, which suggests that the composting process may be a catalyst for growth. The heat and high moisture content during composting may allow for multiplication of several *Legionella* species to detectable levels [18]. The route of transmission of *L. longbeachae* from contaminated environmental samples remains unknown [7,18].

In 1990, a study determining the incidence of *Legionella* spp. in potting mix found that more than two thirds (33/45) of Australian potting mixes and none (0/19) of European potting mixes tested positive for *Legionella* spp [18]. The authors postulated that the discrepancy between incidence of *L. longbeachae* infection in Australia and the rest of the world, particularly Europe, was attributable to the content of commercial potting mix. In Australia, potting mix is made mostly from composted pine waste products, such as sawdust and hammer-milled bark. In Europe, peat is the main component of potting mix [16,18]. In 2001, a similar study in Japan found that 2 of 24 commercial potting mixes contained *L. longbeachae*. The main component of Japanese potting mix is composted wood products, particularly composted oak. The Japanese study also found that an amoebic enrichment of the potting mixes resulted in 9 of 24 potting mixes testing positive for *L. longbeachae*. This finding demonstrated that

L. longbeachae can parasitize soil protozoa and that it was present in potting mixes but at numbers lower than the limit detected by using culture [8]. Genomic analysis subsequently confirmed this parasitic capability [20]. In 2008, testing for *Legionella* spp. was conducted on 46 commercial potting mixes in Switzerland. Two of 46 were culture positive for *L. longbeachae* and almost half (21/46) for *Legionella* spp. Most (41/46) of the potting mixes tested positive by quantitative PCR for *Legionella* spp. Two thirds of these potting mixes contained peat as the base component. This result contradicted previous studies on European potting mixes but supported the emerging trend of increasing numbers of reported *L. longbeachae* cases [12,18].

Detection

Detection of *Legionella* spp. by culture techniques is insensitive. Overgrowth of culture media with competing flora is a major problem [1,2]. This problem is heightened for detection of *L. longbeachae* in potting mixes. Potting mixes have a high microbial load and contain spore-forming bacteria and fungi associated with composting. As a result, heat pretreatment of potting mixes tends to stimulate germination of spores and rapid overgrowth of the agar medium, rather than reduce competing flora. Acid pretreatment is the preferred option [18]. The variable nature, pH, buffering capacity, and humic content of commercial compost and potting mixes means that the duration of acid pretreatment is best tailored to the individual sample rather than being generically applied [12,18].

Molecular methods (quantitative PCR) have been used recently to quantitatively detect *Legionella* spp. in potting mixes when culture methods gave negative results [11]. Improved but nonquantifiable detection in potting soils also have been reported after amoebic enrichment of soil samples [8].

Disease Prevalence

Clinical presentations of *L. longbeachae* infections are similar to those of other legionelloses [21]. Risk factors for infection in common with other *Legionella* infections are smoking, preexisting medical conditions, and immunosuppression. Gardening activities and use of potting mixes are risk factors that are so far unique to *L. longbeachae* infection [7]. The disease predominantly affects persons <50 years of age, and reports suggest the median age for infection is slightly higher for *L. longbeachae* than for *L. pneumophila* [2,7,16,21]. In addition, fewer deaths tend to be associated with *L. longbeachae* infection than with *L. pneumophila* [21]. The virulence factors associated with *L. longbeachae* clearly differ from those of *L. pneumophila*, which may help explain the differences in disease prevalence and severity [20].

Recently, *L. longbeachae*–derived Legionnaires' disease has increased worldwide. In the Netherlands during 2000–2004, the first 5 reported cases of *L. longbeachae*–derived pneumonia were reported [13]. Potting mix was associated with infection when analysis found a genotypically identical strain of *L. longbeachae* in the patient's sputum and in the potting mix. Two other patients of the 5 had indistinguishable genotypes, 1 of whom had visited the same gardening center as the index patient. Unfortunately, further analysis of the cluster was not possible because 3 of the patients died after hospital admission [13].

In Thailand, a population-based survey was conducted during 2003–2004 on 556 pneumonia patients >18 years of age who received chest radiographs and etiologic testing. This study found no positive cases of *L. pneumophila* and 20 (5%) cases of *L. longbeachae*. The global increase in infection rates is associated with soils and potting mixes This study did not identify an environmental source of infection [10]. In 2004, a 25-year-old woman in Spain who had systemic lupus erythematosus died of community-acquired *L. longbeachae*–derived pneumonia [14].

During 2008–2009, Scotland recorded a cluster of Legionnaires' disease caused by *L. longbeachae*. Potting mix was associated with all 3 cases of infection. *L. longbeachae* isolates from patients and potting mix were genotyped by amplified fragment-length polymorphism. The genotypes isolated from the first 2 patients matched the genotypes from the associated potting mixes. No isolate was available from the third patient, but the genotype from the potting mix matched the genotype from the first patient. The first 2 patients had contact with the same brand of potting mix, which contained composted green waste (heat treated at 65°C for 5–10 days) and 30%–50% peat that had not been heat treated. The second patient also had contact with a second brand of potting mix that contained 75%–80% peat that had not been heat treated. The third patient had contact with compost made from expanded wood fiber, coir, and bark [22].

These reports contrast with previous reports of *L. longbeachae* in Europe. In 1999, the European Working Group on Legionella Infections reported only 2 cases of *L. longbeachae* from a total of 337 (<1%) reported *Legionella* spp. infections [22]. In 2008, *L. longbeachae* was noted as the dominant species among non–*L. pneumophila* infections in Europe [23].

The number of reported *L. longbeachae* cases might not truly represent the total numbers because the infection in many patients might go undiagnosed. Standard routine diagnostic testing for pneumonia patients involves a legionellosis urine antigen test, which detects only *L. pneumophila* serogroup 1 [22]). Also, many patients with Pontiac fever might not require hospitalization and might not be aware they have a *Legionella* spp. infection [1].

Survival in the Environment

The mechanisms that enable *Legionella* spp. to infect protozoa also enable opportunistic infection of the alveolar macrophages within human lungs. *Legionella* spp. infect and multiply within protozoan hosts in the absence of any other supporting nutrients [2]. The relationship between *L. pneumophila* and a range of protozoan hosts has been documented in detail [1,2]. The relationship between *L. longbeachae* and protozoan hosts is not as well understood.

Experimentally, both *L. pneumophila* and *L. longbeachae* infected the ciliate *Tetrahymena pyriformis*, although protozoan susceptibility to infection varied according to strain differences and available nutrients [24]. In addition, although in situ *L. pneumophila* can infect and multiply within *Acanthamoeba castellanii, L. longbeachae* is unable to do so [25].

Recently both *L. pneumophila* and *L. longbeachae* have been shown to colonize and persist within the intestinal tracts of *Caenorhabditis* nematodes in laboratory assays and soil environments. *Legionella* spp.

replicated within the intestinal tract but did not invade surrounding tissue and were excreted as differentiated forms similar in structure to protozoan cysts. This study suggested that nematodes may serve as natural hosts for *Legionella* spp. and assist in their propagation throughout soil environments. The ability of *L. longbeachae* to infect protozoan and metazoan hosts allows for long-term contamination of environmental sites [26]. The ability to survive protozoan cyst formation might also explain ability of *L. longbeachae* to endure the composting process and survive in desiccated potting mixes [16,18].

Disease Transmission

Spatially and temporally linked Legionnaires' disease outbreaks associated with *L. longbeachae* have never been confirmed. The first cluster of cases detected in South Australia was reported as seasonally but not geographically related [27]. Seasonal clustering of cases during spring and autumn has been noted in Australia and overseas [22,27].

Cases of disease typically are sporadic and statistically associated with potting mix use and gardening activities [28,29]. The route of disease transmission remains uncertain, although close proximity or direct contact with composts and potting mixes support hand-to-mouth, aspiration, or aerosolization routes of infection [7]. No reports have been published that detail infection associated with long-distance travel of *L. longbeachae*, which contrasts markedly with the considerable distances travelled by other *Legionella* spp. during disease outbreaks [2].

A recent report detailed an outbreak of *L. longbeachae* infection in a commercial nursery [28]. In this instance, Pontiac fever was the clinical presentation. Workers were in an enclosed facility without respiratory protection and with considerable potential for dust and aerosol generation. This is the first report of either Pontiac fever or a temporally and spatially confirmed outbreak of legionellosis associated with *L. longbeachae* [28].

Reported cases of infection in Asia, Europe, and the United States follow a similar pattern of sporadic disease linked to direct exposure to potting mix and compost [9,10,13,22,29]. The rarity of outbreaks of disease and prerequisite for direct exposure suggest an alternative route of transmission of disease to other *Legionella* spp., and the literature alludes to this information [7,18]. Concentrations of the organism per gram of potting mix have been reported that are comparable to those associated with Legionnaires' disease per milliliter attributed to water systems [1,2,12]. In addition, other disease-causing legionellae are present in potting mixes [8,18]. In only 1 instance has potting mix been (inconclusively) implicated as a possible source of Legionnaires' disease from an organism other than *L. longbeachae* [30]. Why potting mix is a source of infection from only this species remains a mystery.

Currently, no strategies are available to control or eliminate *Legionella* spp. in potting mixes. Awareness of health risks associated with handling compost and potting mixes protects against disease; the precise nature of this protective effect is unknown [7]. In Australia, all bagged potting mixes and compost carry a health warning and recommendations for how to avoid infection. These recommendations include using a face mask, avoiding inhalation of dust and aerosols, and washing hands after using the material [31].

Conclusions

L. longbeachae infections have accounted for a major proportion of legionelloses in Australia and New Zealand since the late 1980s [7]. Recently, the global incidence of reported *L. longbeachae* infections has increased [9,23,28]. Factors explaining this emergence of infections are unknown but may be result in part from improved surveillance [23]. In all reports, disease transmission is associated with soils, composts, and potting mixes rather than with water systems, with which other *Legionella* spp. infections are associated [7,18.27]. The mechanism of *L. longbeachae* transmission remains unknown, but close association with contaminated material is a recurrent theme [7]. Long-distance travel of the organism and subsequent infection has not been documented, which may suggest that disease is not transmitted through aerosol inhalation [7,18,27]. The environmental reservoir for this *Legionella* species is yet to be identified, and association with a range of plant materials has been postulated [7,18,20]. Isolation from peat-based potting mixes confounds this theory to some extent [12,13]. Control strategies for this emerging disease are limited to published warnings on bagged products relating to handling and exposure [7,22,31].

Biographies

Dr Whiley is a postgraduate student at Flinders University, Adelaide, South Australia, Australia. Her research focuses on the molecular detection of *Legionella* spp. and other opportunist intracellular pathogens in environmental systems.

Dr Bentham is associate professor in public health microbiology at Flinders University. His research interests include human health risk assessment, *Legionella* spp. ecology, and control and bioremediation of contaminated soils.

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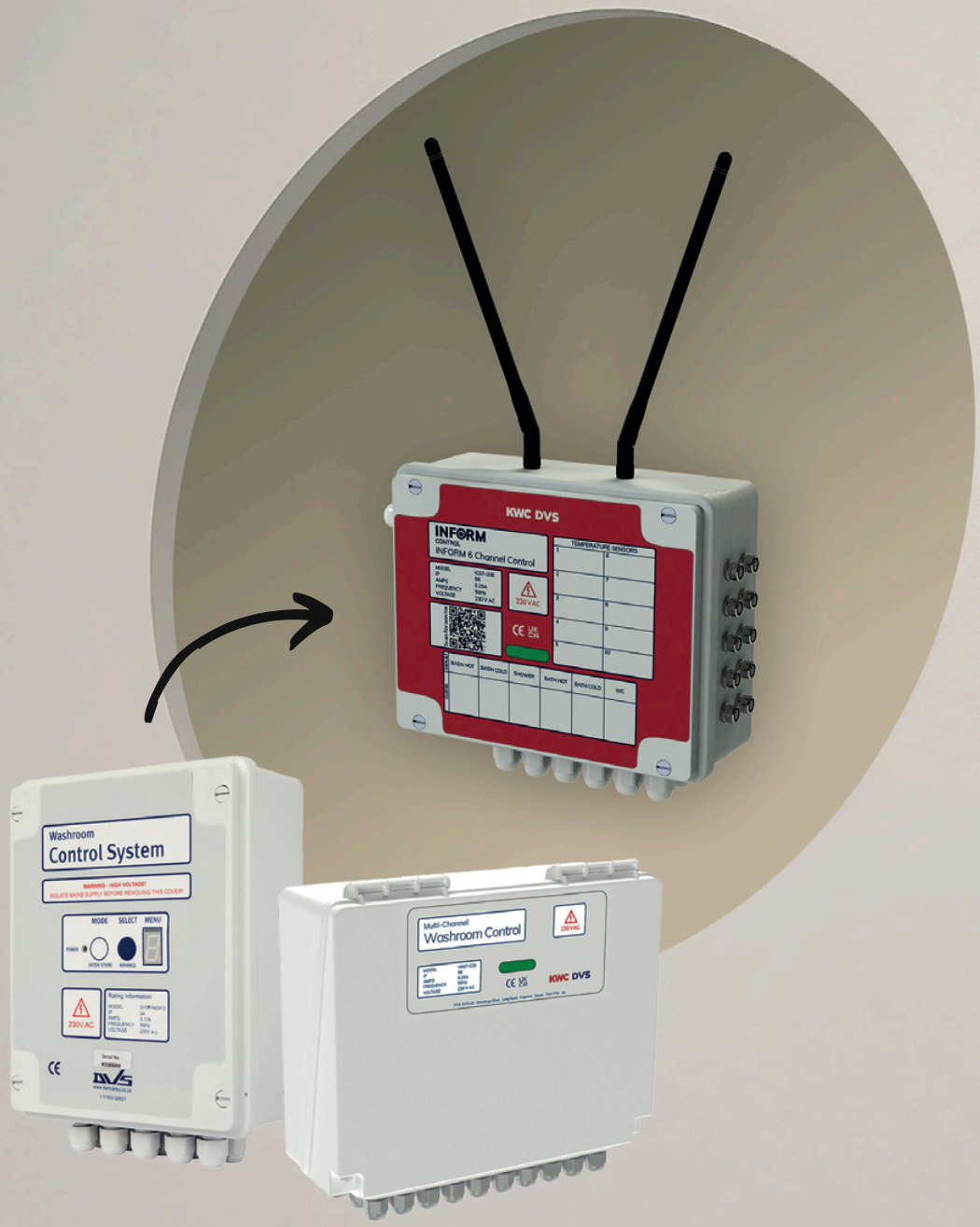

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PCR
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event report

Legionella Control Association Spring Events

Navigating the Future of Compliance

This Spring, the Legionella Control Association held three events in Edinburgh, Tamworth, and London. All events had the same programme and focused on the key updates that they are making to company audit service standards, which will take effect in September 2025.

After an introduction from the chair, the trade stands gave a one-minute presentation each to the delegates. From here, the presentations began...

Ceri Rideout started off the day's presentations with an update from the HSE. This update included a brief overview of the updates on Legionella risk in plastic injection moulding sites (with registered cooling towers) intervention campaign, a summary of recent Legionella-based prosecutions (including breakdowns of what went wrong and the court rulings), and new operational guidance for HSE inspectors that could impact service providers.

The LCA Manager, **Matt Morse**, followed Ceri's great update with a presentation entitled 'Do I need a Statement of Compliance?' This presentation focused on LCA memberships, including the process of application and how it will change for the 2025-26 registration year and beyond, how to stay a member of the LCA through re-registration, and the important things to note about LCA membership, such as managing quality assurance and internal audits.

The intent for new applicants is to make the initial application process more understandable with simple open language and meaningful with an increased focus on legionella. For existing members, the changes to auditing are to move away from auditing procedure/upstream process and focus on downstream process/output.

Matt covered some significant changes to the audit template to make the process clearer and more specific to the different types of output seen from members. For each service delivery audit there will be a core "head" section covering items more universally applicable items such as training and competence, quality assurance, advising clients on legal obligations, etc. followed by "tails" specific to each sub type of service delivery. Not all tails will be applicable to all service providers or all service delivery. For example, within cleaning and disinfection there are tail questions to specifically audit tank disinfection and separate tail questions to audit cooling tower disinfection – not one size fits all. The new process is intended to enable more focus on the quality of the work delivered with clarity on the applicability of questions.

Graham Thompson, LCA Assessor, looked at the detail of the updated audit template for auditing of plant and equipment services. He touched on the issue that many companies often 'forget' this service standard in their internal audits and gave a comprehensive view of how to properly audit this service delivery. He also stated what may be expected in an LCA audit of this standard, and what was covered in the scope.

Nick Barsby presented 'Legionella Monitoring – Audit Awareness'. This reiterated the new format of a core followed by different tails, this will enable laboratories to be audited with a specific question set. There will also be specific "tail" questions for members who may be using rapid or other "field" legionella identification tests.

The LCA Chair, **John Smith**, presented 'The Delivery of Training & Consultancy Services', focused on those offering formal training to their customers in aspects of Legionella awareness/control as either standard or bespoke courses. He detailed some of the audit questions that could be asked for each auditing point and what could go wrong e.g. not demonstrating that you understand the needs of the clients required learning outcomes. He also explained the scope for "Consultancy" and what may be required in the new audit form.

The "Auditing of Cleaning and Disinfection" was then covered by LCA Vice Chair, **Ashley Lowry**. He spoke about what the standard covers, the new approach to auditing (what has changed, what hasn't, etc). He also drew focus toward why people had failed their audits on this category before, as well as the output of being audited for this standard. He finished with highlighting a few more key pieces of information, such as the importance of an internal quality process, acting on your findings (and documenting them), why focusing on output is so important, and how the changes to the audit form will ultimately make things easier for LCA members and better for their clients

The afternoon session began with **Nick Barsby** and **Matt Morse** presenting together on the auditing of Water Hygiene Services. There was discussion as to what "hot and cold water monitoring" now encompasses, as the LCA have moved minor clean and disinfection and TMV maintenance to the scope of this standard and overall, the standard now reflects the content of table 2.1 of HSG274. The various reasons for some of the new focus was explained including feedback and complaints from LCA service users.

Chris Wilding, LCA Committee member, presented on the auditing of Water Treatment. He outlined the importance of all the service standards and then detailed what a complete audit should include. He spoke about how procedures should be translated to auditing, for example, 'what you do' defines your scope and Areas of Interest. He finished by outlining what the new audit form will entail with regard to water treatment.

Graham Thompson gave the final presentation of the day on auditing Legionella Risk Assessments. He focused on what makes a good risk assessment, and how the LCA will now define that within the audit document. Initially, he covered scope of registration, before moving onto risk rating systems, and possible audit questions for the standards.

The recent conferences were intended to provide information regarding some significant upcoming changes to the LCA auditing documents. There will be few and minor changes to the service standards, but the intent will be to make the audit process more meaningful for members. The LCA is not changing the syllabus, but we are revising the exam questions. Essentially if members are performing high quality internal audits and quality controlling their output then future audits should be straightforward. In future the principal focus on procedures will be at application with a shift of focus to downstream process such as method statements and templates, and work output at the annual Company Audit.

The new audit form will be available on the LCA website in August 2025 and will be being used by the LCA assessors from 1st September 2025. Legionella Control - Code of Conduct for Service Providers.

How can Water Treaters Benefit from Recent Peer-Reviewed Data on *Legionella* Testing Methods?

By Jeff Bates, IDEXX Laboratories

This article originally appeared in the Spring 2023 Analyst, the quarterly journal of the Association of Water Technologies. It is published in Waterline with permission of the author and the AWT.

Water treaters are primary actors in the fight against waterborne disease due to their role managing premise plumbing systems and *Legionella* risk. Unfortunately, guidance on *Legionella* risk management is often limited or unclear, especially around interpreting the results of environmental Legionella sampling. A key contributing factor is the fact that traditional Buffered Charcoal Yeast Extract (BCYE) methods for Legionella detection, such as ISO 1131 and the CDC method, are inaccurate and highly variable. To address these challenges, new methods for *Legionella* detection have been introduced. Both PCR and liquid culture methods have been extensively studied in peer-reviewed literature. The available research demonstrates that PCR can be effectively used as a negative screen to rule out the presence of *Legionella* in the case of a negative PCR result. Eleven peer-reviewed studies also demonstrate that liquid culture is more sensitive than traditional BCYE methods, and there is strong evidence that liquid culture provides more consistent results than BCYE methods. These findings may be the basis for improved guidance in the future. In the meantime, water treaters can use these insights to benefit from these new methods, provide better risk management to their customers, and ultimately better protect public health.

Introduction

Building owners and facility managers increasingly look to water treaters to manage *Legionella* risk. The general public is becoming more educated on *Legionella*, in part due to the well-documented increases in the recorded incidence of Legionnaires' disease around the world. Perhaps more important and troubling is that the overall number of waterborne disease outbreaks in the U.S. is increasing due to *Legionella* **(Figure 1)**. After many years of decline in waterborne illnesses driven by improvements in drinking water regulation and operation, *Legionella* and other biofilm-associated pathogens are driving increases in hospitalizations and deaths in the U.S., with an estimated annual cost of $2.39 billion in 2014 [1].

While there are environmental consultants and other industry players that address *Legionella* risk in premise plumbing, customers look to water treaters, almost by default, to manage this risk. Anecdotally, many water treaters now require their customers to test for *Legionella* or waive any claim to liability if they decide not to do so. Water treaters are now perhaps the primary line of defense against *Legionella*, and therefore against increases in waterborne disease in the U.S.

Guidance on Testing for *Legionella*

Despite this important role of protecting public health, water treaters consistently contend with incomplete and unclear guidance on how to best manage *Legionella* risk and control *Legionella* growth. These challenges are especially pronounced with respect to testing for *Legionella*.

The water treatment industry is generally aligned that testing for *Legionella* in both cooling towers and premise plumbing is best practice for reducing risk. The AWT's 2019 position statement on *Legionella* outlines that, although water management teams can decide whether to perform environmental sampling as part of a water management plan, *"Legionella testing is the only direct or "active" way (currently) to validate (water management) program effectiveness"* [3]. Unfortunately, guidance from the Centers for Disease Control and Prevention (CDC) is less clear— it suggests that routine testing may be beneficial in facilities that are unable to consistently meet control limits [4]. A water treater might only realize that most facilities fall into this category after seeking out experts or through experience in the field.

Guidance on how to interpret *Legionella* test results is also confusing. The CDC aims to provide a multifactorial approach based on *Legionella* concentration, changes in concentration, and extent of positivity. Unfortunately, the CDC's complex, footnote-heavy chart simply boils down to a handful of factors that suggest poor control of *Legionella*. There is little to no discussion of the intersection between concentrations, growth, extent, and type of *Legionella*. If *Legionella* is shown to be poorly controlled, readers are instructed to perform a complex set of tasks that ends in "considering" whether remedial treatment is needed [4].

This leaves many water treaters and their customers without a clear sense of how to interpret results or best mitigate risk.

In the Technology Supplement to the Fall 2017 *Analyst*, M. Freije [5] provided additional guidance on interpreting results, noting these factors to consider: 1. "breakdown of findings" (e.g., where samples were collected or whether they were pre- or post-flush); 2. equipment-specific remediation; and 3. occupant susceptibility. He provides a strong framework for interpreting results, including examples of how the different factors may interact. Interpreting results is inherently a complex task; however, and specific guidance on every factor and every interaction goes beyond the scope of an *Analyst* article. While Freije's article is a good start, water treaters looking for clear guidance on interpreting *Legionella* test results must still seek out other experts or learn through experience.

The inability to provide clear guidance on testing for *Legionella* and interpreting *Legionella* test results is an outcome of several factors, including lack of definitive data on the infectious dose of *Legionella* and susceptibility of potential hosts [6]. Deficiencies in traditional methods for detection of *Legionella* (e.g., Buffered Charcoal Yeast Extract (BCYE) or spread-plate methods) are also a major contributor to unclear guidance. As outlined by the EPA:

> *Despite a number of published procedures for the detection of Legionella in water samples, standard culture methods remain limited by their sensitivity and unreliability in detecting a wide range of Legionella spp. on a consistent basis...*

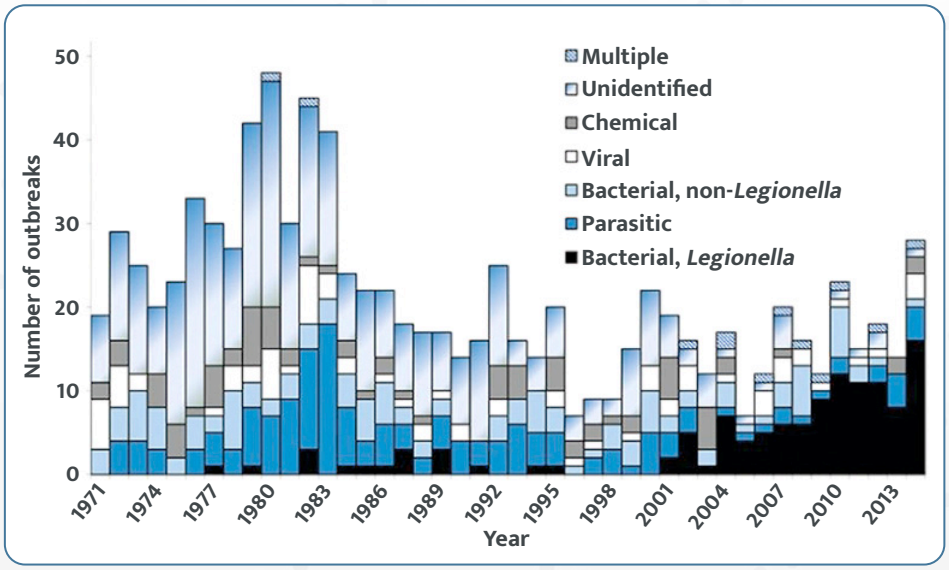

Figure 1: Etiology of reported drinking water associated outbreaks in the United States (n = 298) by year, 1971 to 2014. *Source: Reference 2, NASEM (2020).*

These limitations make interpreting results difficult. Logically, test results that are inaccurate and inconsistent are difficult to interpret. Unfortunately, BCYE-type spread-plate results (often referred to as "traditional" or "standard" culture) have been shown to be both inaccurate and inconsistent.

BCYE Culture Challenges

Perhaps the clearest demonstration of those shortcomings is a study performed by researchers at the CDC in 2011 [7]. Samples with known concentrations of *Legionella* were sent to 20 CDC Environmental *Legionella* Isolation Techniques (ELITE) laboratories to evaluate laboratory limits of detection as well as the accuracy of *Legionella* counts. The samples that were distributed were either positive (seeded with *Legionella*), negative, or "variable." Variable samples were either seeded with low levels of *Legionella* or contained high levels of competing bacteria in addition to *Legionella*.

The study uncovered two key findings. First, CDC ELITE laboratories[A] using spread-plate culture methods incorrectly identified 37% of variable samples as negative. This is a significant rate of false negatives, especially considering these variable samples approximate real-world samples. Practically, this data suggests that monitoring facilities or cooling towers with spread-plate culture methods may provide a false sense of security and inaccurately characterize risk.

The second key finding was that when laboratories identified samples as positive, they underestimated the amount of *Legionella* in positive samples by over ten-fold, or 1.25 logs, with more than a thousand-fold variability, or 3.57 logs. This level of inaccuracy once again highlights that monitoring with spread-plate culture methods can underestimate true *Legionella* risk. It is also important to highlight the implications of such a high level of variability. If results can be so variable, it becomes more obvious why no federal agency or standards organization is willing to provide concrete guidance based on those results.

The CDC study evaluated the different factors that could have led to such a high rate of false negatives and such extreme variability in results. The researchers evaluated sampling protocol, treatment, incubation, and experience level as possible factors influencing accuracy and consistency. Ultimately, the CDC found that none of these factors explained the inaccuracy and inconsistency seen in results, and that "the observed variability in enumeration by both U.S. and EU laboratories is probably due to the inherent inconsistency in assessing a sample by culture techniques." In this case the researchers refer specifically to BCYE spread-plate culture methods.

The findings in the 2011 CDC study are corroborated by other studies. Boulanger and Edelstein [8] found that spread-plate methods recovered a maximum of 53% of *Legionella*, and Díaz-Flores et. al. [9] found that 20% of samples evaluated by spread-plate culture were inconclusive, "making effective risk management impossible." A smaller study of inter-lab variability by Freije [5] demonstrated between 120 and 145% variability in results between different laboratories, with 22% of samples categorized as over 10 colony forming units per milliliter (CFU/mL) by one lab and under 10 CFU/mL by another.

This poor method performance and the resulting difficulty in interpreting testing results can have a real impact on water treaters. Meaningful risk to customers and water treaters alike can go unaccounted for, and *Legionella* remediation can be stymied by poor or inconsistent results. Given these consequences, water treaters may rightly ask, "could improved methods lead to more clarity when interpreting *Legionella* results?"

Several new methods for the detection of *Legionella* have been introduced, promising to address certain challenges associated with traditional BCYE spread-plate culture testing methods. To understand the impact these technologies could have, discerning water treaters will look to peer-reviewed literature to understand the performance of these new methods. While the discussion below is not an exhaustive review of all new *Legionella* methods, it summarizes research on key technologies that have been extensively studied and referenced in *Legionella* guidance, including ASHRAE Guideline 12[B] [10].

Legionella Detection by PCR

One technology that has been extensively proposed as a potential way to improve environmental sampling of *Legionella* is molecular detection or polymerase chain reaction (PCR) technology. PCR tests isolate and replicate specific sequences of DNA. Tests can be designed to detect *Legionella* species, *Legionella* pneumophila, and/or *L. pneumophil*a SG1, and measuring the replication process provides a relative measurement of the amount of DNA in the original sample. A key advantage of the test is that it can be performed in a matter of hours vs. the days required to culture *Legionella*.

Because PCR has been so extensively proposed as a *Legionella* test, an exhaustive literature review is beyond the scope of this article. However, several studies have demonstrated that PCR has a high negative predictive value for *Legionella* [11-14], meaning that samples that are negative by PCR are highly likely to be negative by culture. Certain studies have demonstrated 100% negative predictive value, meaning that all samples negative by PCR analysis were also negative by culture [11], but others did not reach that mark [12], and the figure has varied by water type, reaching as low as 70% for potable water in one study [13]. However, in general using PCR as a negative screen and confirming any positives with a culture test appears to be an accepted practice. It is recommended by the CDC [4], and successfully used by the New York Department of Health [15].

PCR is often recommended for use in conjunction with culture testing and not as a standalone test. A key reason is that PCR routinely returns more positive results than a culture. In a review of 28 studies, Whiley et. al. [16] found that 72% of PCR results were positive for *Legionella*, while only 34% were positive by culture. In an especially stark example, drinking water samples in New York City were tested by both PCR and liquid culture. Eighty-five percent of those samples were positive for *Legionella* by PCR, but only 2.8% were positive by culture [17]. Several studies have acknowledged that one factor in increased PCR positivity is that the technology detects DNA from dead and non-viable *Legionella* cells. A culture confirmation is recommended in order to discern whether a positive result represents viable *Legionella* that may pose a health risk, or dead *Legionella* that has been successfully remediated.

Researchers have been working to overcome this obstacle for several years. They have focused on eliminating positive results due to non-viable *Legionella* with two compounds: propidium monoazide (PMA) and ethidium monoazide (EMA). In brief, both substances penetrate the membranes of dead cells, but not living cells. PMA and EMA then bond with the DNA in those cells when exposed to light. DNA that bonds with PMA or EMA will not provide a positive PCR result, so PCR combined with a PMA or EMA treatment has been evaluated to measure only viable *Legionella*. These compounds have been extensively evaluated for this purpose, with studies dating back to at least 2006 [18].

Unfortunately, a review of these studies does not lead to a definitive conclusion. Using PMA and EMA to eliminate DNA from non-viable *Legionella* from a sample assumes that viability correlates with whether the membranes of the cell can be penetrated by these compounds, but this has not been well studied. Certain studies have suggested that EMA can penetrate some cells with intact membranes, and that only PMA should be used for determining viability [19]. Another study, however, found that EMA provided better results for *Legionella* specifically [20].

Both substances require a light source to bond to DNA, but high levels of suspended solids or other biomass could keep light from reaching the entire sample [19]. This may be a possible explanation for a study that found that EMA reduced the number of *Legionella* positives in bathing water, but not in cooling tower water [21], which is notoriously dirtier and more turbid. Other studies did not find significant differences between detection of untreated and heat-treated samples when using PMA, suggesting the compound may not be able to completely discriminate between live and dead bacteria [22]. In general, the field has not yet aligned on the use of PMA or EMA for detecting viable *Legionella*; even studies that returned impressive results still advocate that PCR should be confirmed with culture [20]. Whether EMA and PMA can be used with PCR to detect only viable *Legionella* appears to require additional research.

This lack of definitive data is highlighted by the Veteran Health Administration's (VHA) decision to allow PCR for use only as a negative screen. As stated in VHA Directive 1061 [23]:

> *If a water is negative by PCR, then further processing of that sample by culture is not required and the sample can be considered "negative for Legionella detection"... For samples that are Legionella-positive by PCR, the following requirements*

apply: The PCR-positive water sample must be processed by a culture method (in accordance with laboratory selection criteria) to confirm living Legionella are in the sample. While some PCR tests claim ability to differentiate between living and dead Legionella, such designations are not sufficiently reliable and use of the PCR result to determine that the Legionella are living is not permitted.

Other aspects of PCR tests for *Legionella* that require more study are the impacts of inhibition on test results. PCR reactions may be adversely affected by substances in a *Legionella* sample, and PCR studies have detected measurable inhibition in up to 46% of samples [12].

Additionally, PCR provides a result in genomic units (GU). While several studies have tried to correlate GUs to CFU action limits, cutoff values have varied by matrix and laboratory [13, 24, 25], making uniform guidance impossible.

Despite these challenges, it is well acknowledged that PCR testing can greatly simplify and accelerate *Legionella* testing when used as a negative screen, as described above. Additionally, there is at least one ongoing study on whether different compounds can enhance PCR to only detect viable *Legionella*, and water treaters should review any future research with an eye towards how PCR could impact the field of *Legionella* testing.

Legionella Detection by Liquid Culture

Another method that has been introduced for *Legionella* detection is liquid culture, also referred to as the most probable number (MPN) method or the bacterial enzyme method. In this method, the sample is combined with a reagent containing nutrients to promote *L. pneumophila* growth, selective agents to suppress growth of non-*Legionella* organisms, and a substrate. Actively growing strains of *L. pneumophila* use this substrate to produce a brown color indicator that signals a positive result.

This greatly simplifies testing when compared to traditional BCYE spread plate methods. In brief, BCYE spread plate methods require the analyst to use his or her judgement to choose from several sample treatments, from filtration, to acid and heat treatments, which may reduce *Legionella* recovery. The output from these treatments are then plated on solid media, and again the analyst must choose between different formulations. Suspected *Legionella* colonies are then confirmed via streaking on additional solid media. Liquid culture testing maintains the benefits of culture testing, but significantly simplifies the process by culturing bacteria in a liquid medium, as described above.

In order to provide a quantitative result, the liquid culture test is performed by pouring the mixed reagent and sample into an incubation tray with 96 wells. The wells are physically separated from each other so that each well contains a separate reaction. Positive wells are used to estimate the number of viable bacteria in a sample: an MPN result. MPN results are equivalent to results in CFUs [26]. Tests based on MPN results are used around the world and are accepted by regulators in over 50 countries. As of the writing of this paper, there is only one commercially available liquid culture test for *L. pneumophila*: the Legiolert test.

Liquid culture has been extensively compared to traditional methods for Legionella detection in peer-reviewed literature. To date, there have been 11 studies that directly compare the performance of traditional methods to the liquid culture method in environmental samples [27-37]. While the specific method compared varies slightly across these studies, all compared methods were based on BCYE spread-plate procedures, including the protocol sometimes referred to as the CDC Method (although the CDC does not endorse any specific method). The most frequently compared method was ISO 11731. ISO 11731 is likely the most common BCYE method used worldwide and is stipulated for use in several global regulations and in the state of New York.

Each of these studies evaluated liquid culture against the BCYE method in real-world, routine environmental samples, eliminating any bias or impact associated with laboratory-grown *Legionella*, which often behave very differently than *Legionella* that grow "in the wild." In total, the studies evaluated 2,085 samples across 7 countries in North America, Europe, and Asia. A total of 20 labs participated across studies and included researchers from the U.S. Environmental Protection Agency (EPA), the Italian Ministry of Public Health, and major *Legionella* testing labs in the U.S., including EMSL. The studies were published in 10 different scientific journals with an average impact factor of 3, generally meaning they are well-respected publications. Four of the studies applied the rigorous criteria set out in ISO 17994: *Requirements for the comparison of the relative recovery of microorganisms by two quantitative methods* [38].

The primary finding of nearly all studies was that liquid culture is a more sensitive and accurate method for detecting *L. pneumophila* than BCYE methods, including ISO 11731. Ten of the eleven studies ran statistical analyses to determine whether the liquid culture method was statistically more sensitive than traditional methods. Nine of those ten studies found liquid culture approaches to be more sensitive in at least one type of water or with at least one statistical test. All studies found that the liquid culture method had at least equivalent sensitivity to BCYE methods across all water types and statistical tests, and none of these studies found BCYE methods to be more sensitive. While a complete meta-analysis of these studies is beyond the scope of this article, the liquid culture approach identified 1,083 positive samples in the studies where this data was made available, while traditional methods only identified 918. In multiple studies, the liquid culture method identified certain samples that were above relevant action limits, when the traditional method returned a negative result. These examples represent instances where monitoring with traditional methods would have left building occupants at risk and where liquid culture appropriately identified that risk. When taken together, the studies demonstrate that liquid culture is a more sensitive and accurate test for *L. pneumophila* than traditional, BCYE-based methods.

Several studies provided possible explanations of why liquid culture may provide a more accurate result than traditional BCYE methods. Many researchers have identified interference from non-*Legionella* organisms as a key challenge in reading BCYE plates, especially in non-potable samples. Because liquid culture isolates each individual reaction, interference is minimized, and counts are more accurate. Researchers from the EPA analyzed 15 samples where *L. pneumophila* could not be identified due to overgrowth of non-*Legionella* bacteria on BCYE plates. Liquid culture found high concentrations of *L. pneumophila* in those same samples. This is important as it indicates that there can be serious Legionella risk that is missed when plates are overgrown with non-*Legionella* organisms, a relatively common occurrence.

The studies also highlighted that many of the treatments involved with BCYE methods that aim to minimize the growth of non-*Legionella* bacteria also likely reduce overall *Legionella* counts. And finally, the studies point out that because *Legionella* is a waterborne bacteria, it may grow better in a liquid medium than it does on solid agar plates, as has been found with certain other bacteria [39, 40]. The exact mechanisms of improved sensitivity and accuracy have not been adequately studied, but the above explanations for the improved performance of liquid culture are certainly logical given what is currently known about *Legionella* and the two test methods.

Seven of the studies referenced in this article provided measurements of the specificity of the liquid culture method for *L. pneumophila*—in other words, whether or not the method produces false positives. All studies found that the liquid culture method had acceptable specificity, between 96 and 100% [27-29, 33-35, 37]. All microbiological methods produce some level of false positives, including BCYE-based methods [41]. Despite this fact, all study authors suggested that liquid culture is sufficiently specific for the purposes of *Legionella* detection. As stated by researchers from the EPA, "In the present study, there was no evidence of interference by non-target microorganisms when using the (liquid culture) method" [28].

Another peer-reviewed paper also attempts to add to the body of knowledge on the specificity of liquid culture, authored by researchers from Special Pathogens Laboratory [42]. In this study, sterile water was inoculated with laboratory-cultured pathogens at various concentrations and tested by liquid culture. Some of these tests resulted in false-positive results. Unfortunately, this study has little relevance for water treaters or water management team decision-makers, as laboratory-cultured pathogens in sterile water are well recognized to behave differently than pathogens in environmental samples collected from building plumbing, cooling towers, and other relevant sources. There is a large body of peer-reviewed literature that demonstrates a low false-positive rate in liquid culture in environmental samples [27-29, 33-35, 37], which is significantly more

relevant than limited experiments in sterile water. The paper also conflicts with other studies- for example, the NF Validation performed by the Association Française de Normalisation (AFNOR) found no cross-reactivity of one of the pathogens included in the study by Hirsch et. al., despite the bacteria being present at higher levels [43].

As detailed previously, consistency in results is at least as critical as accuracy when water treaters interpret *Legionella* results. Unfortunately, standard practices for comparing two methods, especially by ISO 17994, focus primarily on sensitivity and specificity, and not consistency. There is therefore limited peer-reviewed data on whether the liquid culture method provides more consistent results than traditional spread-plate methods. The liquid culture method does, however, eliminate many of the sources of variability in BCYE methods. Concentration, pretreatment(s), media formulation, and subjectivity in results interpretation all have the potential to be significant sources of variation in BCYE methods. Liquid culture eliminates all those sources of variability with one set procedure for potable water and one for non-potable water, combined with objective results interpretation. Indeed, liquid culture achieved the best possible measure of repeatability in its ISO 13843 validation report. While further study could provide additional insights, it is highly likely that liquid culture provides significantly more consistent results than traditional BCYE methods.

Finally, two of the studies of liquid culture evaluated the test against traditional ISO methods not only for the detection of *L. pneumophila*, but also for the detection of *Legionella species*. The liquid culture test is specific to *L. pneumophila*, the primary pathogen that causes Legionnaires' disease and does not detect non-pneumophila species. Despite this fact, two studies found liquid culture to be statistically equivalent to ISO 11731 for the detection of all Legionella species [29, 37]. These findings demonstrate that liquid culture is so superior for the detection of *L. pneumophila* that it maintains equivalence with traditional methods even when non-pneumophila positives are included in the positive count of the traditional methods.

A detailed discussion of the importance/non-importance of detecting non-pneumophila *Legionella* species is beyond the scope of this article but has been covered in various publications [44-46]. Monitoring exclusively for *L. pneumophila* has been accepted by public health officials in at least 4 countries, however, this continues to be a topic of debate in many others. As outlined by researchers from the Ministry of Public Health in Italy, "routinely monitoring only for the most pathogenic species of a bacteria is already an established practice. For example, *Pseudomonas aeruginosa* is routinely monitored, rather than all species of *Pseudomonas*" [22].

It is important to note that the liquid culture method's improvements in sensitivity, accuracy and consistency come with all the standard benefits of any culture test. As discussed above, MPN and CFU results are interchangeable, and an MPN result can be directly evaluated against an action limit in CFUs. Additionally, the liquid culture method produces in a viable isolate that can be saved and further tested for serotype or genetic sequence, immediately or in the future. This further testing can be critical in identifying whether a cooling tower, building, or other water feature was or was not the source of an outbreak or infection. The New York Department of Health specifically identified the liquid culture method as "essential" for the isolation of clinically relevant strains [15], and liquid culture has been shown to have improved performance for obtaining isolates in outbreak investigation [47].

Closing Thoughts

As demonstrated here, an in-depth review of peer-reviewed literature can provide a wealth of insights and can deepen a water treater's knowledge of microbial methods and *Legionella* in general. Even more important, water treaters can act on these insights to improve service to their customers, and therefore better protect public health. Two primary insights from the above research are:

1. PCR can provide an effective negative screen.

2. Liquid culture provides more accurate and consistent results than traditional BCYE-based methods of Legionella detection.

Knowing that PCR testing can provide a rapid negative screen allows water treaters to work together with their laboratory partners to quickly rule out *Legionella* risk, in the case of a negative result. PCR testing can also be used after a *Legionella* remediation to evaluate whether it was successful, potentially allowing a customer to reopen a building sooner than would otherwise be possible. Positive results can be confirmed with a culture test prior to taking any additional actions. In general, using PCR as a negative screen can deliver more immediate peace of mind to a water treater's customers and can quickly rule out risk.

Knowing that liquid culture provides more accurate and consistent results than BCYE-based *Legionella* detection methods such ISO 11731 also has important implications. Water treaters that work with their laboratory partners to monitor *Legionella* risk in their customers' facilities with liquid culture are more likely to avoid the false negative results associated with traditional spread-plate methods, and therefore more likely to provide an accurate characterization of risk. In the case of a retest or multiple rounds of testing associated with a remediation, liquid culture can eliminate the variability associated with spread-plate testing, providing more insight into what is happening within water systems, and more confidence in results.

Additionally, using a liquid culture method to detect and quantify *Legionella* risk can eliminate one of the important causes of incomplete guidance around interpreting *Legionella* test results. In the long term, this should ultimately lead to improved guidance from experts and governmental organizations. For example, increased confidence that a negative result is a true negative could enable more reliance on that result as a measure of risk. Lower variability in results could allow water treaters to interpret any increase in *Legionella* concentrations as a true indication of increased risk, and not just an anomaly created by method variability. Updating guidance, however, is usually a long process and water treaters that understand the most recent research can benefit from these findings well in advance of adjustments to guidance.

Despite their critical role in protecting public health, water treaters routinely contend with incomplete or confusing *Legionella* guidance. This is due to several gaps in the science of when and how *Legionella* infections occur, as well as the use of highly variable and inaccurate BCYE test methods. Researchers are constantly advancing the state of knowledge around *Legionella* and Legionnaires' disease. At the same time, water treaters now have less variable, more accurate methods at their disposal, and water treaters can look to peer-reviewed literature for insights on how those new methods can enable better *Legionella* risk management. Those who act on those insights will provide better service, and ultimately better protect their customers and the public.

Endnotes

[A] CDC ELITE Program: This program allows laboratories to test their *Legionella* isolation techniques against a set of standardized samples. The CDC ELITE Program identifies laboratories that are able to isolate (grow and identify) *Legionella* from a water sample using a traditional BCYE culture method. Earning an ELITE Certificate does not guarantee that at other times a laboratory will be able to isolate *Legionellae* from every sample in which they are present, because the ability to find *Legionella* in a sample can be affected by the quality of the sample the laboratory receives.

[B] Other environmental testing methods may be an appropriate component to a Water Treater's testing plan but have not been extensively covered in peer-reviewed literature. For example, lateral flow technology may provide a very fast presence absence result as an on-site test but has not been extensively studied by the field.

[C] As of the writing of this article, there is only one commercially available liquid culture test for *L. pneumophila*: the Legiolert test, which is available from IDEXX Laboratories, Inc. (Westbrook, ME).

Jeff Bates is the strategic marketing manager for Premise Water at IDEXX. In his role, he is responsible for promoting testing for waterborne pathogens in premise plumbing systems globally and the IDEXX culture tests Legiolert and Pseudalert.
He holds a bachelor's degree in environmental studies from Middlebury College and received his MBA from the Darden School of Business at the University of Virginia.

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event report

Scottish Legionella Focus Group Conference

Thursday 27th February 2025, Marriott Holyrood Hotel, Edinburgh

The latest SLFG conference was held at the Marriott Holyrood Hotel in Edinburgh on the 27th of February 2025. The Scottish Legionella Focus Group is one of four groups in the country that was set up to support Public Sector Members who are often put into their roles with little training or support. We do this through informative seminars, but also by offering a safe space where questions can be asked to other members, sharing experience and knowledge. The other groups are the North East Councils Legionella Focus Group; North West Councils Legionella Focus Group, and the London Legionella Focus Group. We are not for profit, non-commercial, and rely on the generosity of our sponsors and speakers in order to make these events happen.

The event started off with Hazel Henderson, Consultant in Health Protection specialising in Respiratory bacterial pathogens, Public Health Scotland. Hazel presented on the latest Legionella Surveillance Figures published in August 2024, reporting that the upward trend since the pandemic ended has continued into 2025, with 54 cases notified to Public Health Scotland. Excluding the large outbreak in Edinburgh in 2012, 2023 had the highest number of cases reported since surveillance began in 2000. Despite the increase in cases, Hazel reported that Scotland's incidence of Legionnaires' disease, 9.9 per million population, is low compared to Europe, which has also reported recent increases. The latest ECDC report observed that incidence in Europe in 2021 was 24 per million population, the highest observed since surveillance in Europe began. The reasons behind this are unknown, but factors such as global warming, increased at risk populations, new technologies, and fuel poverty were considered.

Another interesting trend was that historically, the majority of cases in Scotland tended to be travel-related, but in 2023 we saw a significant shift and the larger proportion of cases were community acquired. PHS is monitoring the situation to see whether this continues, or whether it was a one-off occurrence.

Hazel reported on the most common symptoms of Legionnaires' disease which were shortness of breath (72.2%), lethargy (64.8%), cough (59.3%), confusion (29.6%), fever (27.8%), diarrhoea (25.9%) and chest pain (22.2%). Other symptoms included headache, vomiting, thirst, sore throat and muscle aches. Most cases were caused by Legionella pneumophila, but there was a noticeable rise in non-pneumophila reported cases as Legionella longbeachae accounted for 37.5% of cases. The PHS gave us insight into the work they are doing within the community, working with health boards to investigate any clustering of cases, continuing to monitor legionnaires' disease and to map cases – to help identify any clusters, and working with the Reference Lab who are able to help identify cases that are microbiologically linked.

The next to present was Ceri Rideout, Legionella Technical Lead from the HSE. Ceri updated the audience on the current Intervention and details on recent prosecutions.

The latest intervention programme in 2024 focused on the plastic industry with cooling towers. 100 sites were identified via local authority cooling tower registration, 60 were visited. Of those 60 sites visited 40% had some sort of material breach - mostly due to inadequate Risk Assessments, inadequate implementation of a Written Scheme of Control, and inadequate management of risk.

Ceri then went on to discuss the two most recent HSE prosecutions, Amey Community Ltd and Sanctuary housing. Amey Community Ltd was first to be discussed following the death of a prisoner in HMP Lincoln in 2017. The main cause was that they failed to act on the LRA but, the sentence summary included inadequate temperature checks, no written scheme of control, failure to act on temperature failings, and failed to carry out actions in relation to little used outlets, dead ends, and dead legs. Amey Community Ltd pleaded guilty to breaching section 3(1) of the HASAWA 1974 and were fined £600k. The judge concluded Medium Culpability with Harm Level A (death) but medium risk of harm. Ceri stated that the HSE can advocate for higher culpability but the judge ultimately decides on the fine, which is why the fines vary so much.

A Sheltered housing complex in Birkenhead owned by Sanctuary Housing was the next prosecution that Ceri discussed. HSE were made aware of some concerns around legionella positive sample results and residents being rehoused by an external stakeholder. This triggered some initial site enquiries, and a subsequent site visit to establish whether risk was being managed. HSE inspectors found that the systems in place to manage the legionella risk were significantly below the expected standard.

Initially, they rehoused the residents but they moved them back in. They were advised the tap water could be stored in sinks and boiled in kettles to make it safe but they weren't advised not to shower. They had no trained and competent RP appointed, someone was flushing the taps but not weekly and they weren't trained. The risk assessment was not suitable and sufficient, they had no control scheme, no monthly temps and they were exposing vulnerable people. They pleaded guilty to breaching section 3(1) of the HASAWA. The judge ruled there was a high culpability and harm level A (death) but low risk of harm. The starting point for high culpability harm category 3 is £540k, which was substantially increased within backet due to numbers at risk and the fact Sanctuary housing is a very large organisation. The starting point after sentence was increased to £1.2m, but reduced to £900k after early guilty plea.

He then went back to the infamous Barrow-in-Furness outbreak and demonstrated how the key findings in the most recent cases are still relevant after 20 years: Poor lines of communication and unclear lines of responsibility, failure to act on advice and concerns raised, failure to carry out risk assessments, poor management of contractors and contract documentation, and inadequate training and resources were similarities identified in all three cases, which was disappointing to see that 20 years on, we are still seeing the same failures.

Next up was Sonia King from ProEconomy, who also sponsored the event. Sonia presented an excellent case study on the use of Silver Copper Ionisation as an alternative to temperature control at a children's hospital. By reducing the temperature, they removed the scald risk so did not require TMVs or TMTs, thereby reducing the risk, but also the maintenance costs. Monthly temperature monitoring was also not required. Sonia presented legionella sampling results before and after installation of the ionisation which demonstrated that it was being suitably controlled.

Matt Morse was the final presenter of the day. His presentation on "faking it" discussed several case studies where companies were faking lab reports, faking membership and gave helpful tips to the end users on how to protect ourselves. He discussed the most recent case where a water treatment service provider had claimed to be an LCA member but was not, and it turned out that this company had been caught previously for falsifying certificates. He presented some top tips to the audience on how they can be sure that the company they appoint are genuine members and the certification they receive, whether it's lab reports or LCA certificates, are genuine.

The SLFG would like to extend our thanks to ProEconomy, Ceri Rideout, Hazel Henderson, Matt Morse, and Sonia King for your support at this event.

The Words Behind the Water
Etymology in Legionella Risk Management

By Richard Danielson. MWMS (Snr). Second Element Ltd.

After watching Stephen Fry on an old episode of *QI*, explaining the surprising origins of familiar words... (did you know the word *'freelance'* comes from medieval knights who were not aligned to a specific lord and hired themselves out for battle?) ...I thought it might be interesting, or at least *'Quite Interesting'*, to take a look at some of the words we use in our own corner of the world.

Etymology! That's the fancy name for the study of the origins of words and often reveals another layer of meaning. In the field of water hygiene, much of the language we use is technical, shaped by science and engineering. Terms like *Legionella pneumophila*, *biofilm*, and *aerosol* are part of the everyday vocabulary for those of us working to manage water systems safely, but a quick dive below the surface reveals that these words often have a story.

Hopefully, there'll be a surprise or two to follow... or at the very least, a mildly curious "huh" with an accompanying raise of the eyebrows.

Legionella
The origin of the name *Legionella* is known to most of us in the industry. It came about following the 1976 outbreak at a convention in Philadelphia. The newly discovered bacterium was named after the affected group: the American Legion veterans.

It follows the convention in taxonomy (another fancy word that covers the branch of science concerned with classifying organisms) where the name of the genus often nods to an associated event, location, or person.

Other examples include Escherichia *coli* (E-coli) named after German paediatrician Theodor Escherich, who discovered it; and Salmonella, named after American veterinary pathologist Daniel Salmon.

The suffix *-ella* often refers to *'a little'* or *'smaller version of'* but is also a favourite of microbiologists who do love a little Latin flare.

What's less widely known about legionella though, is that it could have been called something entirely different. A similar outbreak occurred three years earlier during a convention of the *Independent Order of Odd Fellows* (they sound fun at parties). It wasn't investigated or linked at the time and only gained attention after the Legionella discovery. I can't help wondering how different things might have sounded had the Odd Fellows case led the headlines and perhaps then we would be talking about *Odd Fellow's Fever* rather than Legionnaires' disease...

Pneumophila
Legionella pneumophila, is the species that has us all paying attention. While the genus *Legionella* points to the circumstances of discovery, the species name *pneumophila* gives us a clue as to the bacterium's behaviour. The word comes from two Greek roots: *pneuma*, meaning "breath," "air," or more specifically, "lung," and *philos*, meaning "loving" or "fond of." Together, *pneumophila* literally means "lung-loving." Quite an expressive name, accurate, and unsettlingly affectionate.

Bacteria
The word bacteria again has its origins in ancient Greek and comes from *baktron*, meaning "stick" or "staff." The term was coined in 1838 by German Christian Gottfried Ehrenberg, who used it to describe the stick-shaped organisms he was seeing under his microscope.

Aerosol
Aerosol is a word that wears its science lightly. Despite its technical origins, it has crossed into everyday vocabulary with ease, on one occasion while delivering Legionella awareness training, I was asked if there's a Legionella risk from Lynx Africa ... for the uninitiated, that's deodorant ... and erm...well no, different kind of aerosol.

In water hygiene though, aerosols are a critical concept, and the route of transmitting Legionella bacteria deep into the lungs to cause infection.

The word *Aerosol* itself is a relatively modern invention 1920-*ish*, but is built from classical roots: *aero*, from the Greek *aēr* (air), and *sol*, short for *solution*, from Latin *solutio*. So, in essence, an aerosol is a "solution in air", that misty mix of particles in a gas that we are so cautious of.

Biofilm
"A nature documentary?" said my Lynx Africa friend when I ask him later if he knew what a Biofilm was... *erm, again... no...* (honestly – LCA auditors these days – I'm kidding! (sort of) no really, I'm kidding ...please don't blacklist me) Etymologically at least, it's almost poetic: bio from the Greek *bios*, meaning "life," and film from Old English *filmen*, meaning "a thin layer" – literally a *layer of life*. Not a bad name at all for a stubborn, slimy matrix of microbes ...ah, now there's a word...

Microbe
Microbe was coined in 1878 by the French military surgeon and biologist Charles-Emmanuel Sédillott in a lecture to the French Academy of Medicine, he proposed it as an alternative to the terms in use at the time - *animalcule*

(although I quite like that!). Built from the Greek *mikros* (small) and *bios* (life), *microbe* referred to all 'small life', and so the word caught on and was quickly adopted.

Calorifier

Of all the terms in the water hygiene world, *calorifier* is possibly my favourite. It has the ring of something you might find in the engine room of a Jules Verne novel, right next to the *transmogifier* and tended by a man in a waistcoat with leather gloves and tinted goggles! The word comes from Latin: *calor* meaning "heat", and the suffix *-ifier*, from *facere* "to make or do". So, quite literally, a *calorifier* is a "heat-maker." It's a beautifully old-fashioned word that persists mainly in our industry, and one that I catch myself automatically explaining to clients: *"We've tested your calorifier... you know ... the hot water cylinder."* Hard to argue with the efficiency of *calorifier*.

Sentinel

Sentinel is one of those words that feels quietly reassuring. In our water hygiene world today, a *sentinel outlet* is one we select for routine temperature checks to represent the broader system, but the word itself comes with a far older lineage. Its roots lie in the Latin *sentire*, meaning "to feel" or "to perceive." Through Old Italian (*sentinella*) and French (*sentinelle*) and evolved into its current English form to mean a watchful guard or lookout.

Hygiene

Hygiene has a clinical neatness to it, but its roots are surprisingly mythological. It traces back to *Hygieia*, the Greek goddess of health, cleanliness, and sanitation. The daughter of Asclepius, god of medicine, Hygieia's role was preventative: not healing illness, but maintaining health and warding off disease before it had a chance to take hold. The word made its way into English via Latin *(hygiena)* and over time, *hygiene* became our word for practices that preserve health through cleanliness and prevention.

So, in the words of Stephen Fry, *"we leave you now with this..."* For those of us in water hygiene, it's a rather elegant reminder: success is often found not in what we fix, but in what we prevent.

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What is Legionella longbeachae?

Legionella longbeachae is a species of Legionella bacteria that can cause Legionnaires' disease, a severe form of pneumonia. Unlike *Legionella pneumophila*, which is commonly associated with contaminated water systems, *L. longbeachae* is primarily associated with soil, compost, and potting mixes.

L. longbeachae was first identified as a distinct species of Legionella in **1980**. The identification followed a case of pneumonia in a patient from Long Beach, California, hence the name "longbeachae."

LEGIONELLA LONGBEACHAE

How does it differ from *Legionella pneumophila*?

Although they are the same genus, there are distinct differences between the two species. The main differences are outlined in our comparison table (right).

Legionella longbeachae infections are most commonly reported in Australia and New Zealand, and *L. longbeachae* infections occur at rates comparable to infections caused by *Legionella pneumophila*.

In the UK, *Legionella pneumophilia* has always been the species of concern. However, we are seeing an increase in cases from *Legionella longbeachae* and it is beginning to steal some of the spotlight.

Feature	*Legionella longbeachae*	*Legionella pneumophila*
Primary Habitat	Soil, compost, potting mix	Natural and artificial water systems (e.g., cooling towers, hot and cold water systems, spas)
Main Transmission Route	Inhalation of contaminated soil/compost dust. Can also infect open wounds	Inhalation/Aspiration of contaminated water aerosols
Prevalence in Legionnaires' Cases	Less common is Europe, but common in Australasia and Asia	Most common cause of Legionnaires' disease worldwide
Known Serogroups	2	15
Detection & Diagnosis	Not detected by standard urinary antigen tests; requires culture or PCR testing	Detected by urinary antigen tests (serogroup 1), culture, or PCR
Growth in Laboratory	More challenging to culture, requires special media	Easier to culture on standard Legionella media (BCYE agar)
Prevention Strategies	Safe handling of compost (wetting before use, wearing masks/gloves)	Water system management (temperature control, disinfection, biocide use)

***Legionella longbeachae* & *Legionella pneumophila* comparison table**

Why is it so important?

- *L. longbeachae* is not picked up via standard urine antigen tests so PCR or culture methods are required, leading to delayed diagnosis and treatment.
- Studies suggest that *L. longbeachae* can cause more severe pneumonia compared to *L. pneumophila*, and has a much higher fatality rate, especially if treatment is delayed due to misdiagnosis or lack of awareness.
- Unlike *Legionella pneumophila*, which is mainly found in water systems, *L. longbeachae* is mainly found in soil, compost, and potting mixes which means that traditional water-based

Legionella control measures do not apply to *L. longbeachae* growth therefore making it harder to control.

• The official statistics reported by the UKHSA in 2023 for England and Wales identified 35 cases of Legionnaires' disease caused by *L. longbeachae* between 2017 to 2023. Of those cases, 10 sadly died, giving a fatality rate of 28.6%, which is much higher than the 5.8% fatality rate from L. pneumophila. Scotland also saw an increase in cases caused by *Legionella longbeachae* – 3 cases were reported by Public Health Scotland in 2023.

• Since it's not well-detected in many standard Legionella surveillance programs, cases may be underreported worldwide.

• Gardening and handling compost or potting mix may significantly increase the risk of infection, especially when inhaling contaminated dust.

Prevention

There are many ways you can protect yourself and others from possible contamination ensuring the health and safety of your customers, your employees, your friends and family and the public.

These include:

Care when Handling Potting Compost and soil

• Moisten the Compost before use: Carefully moistening the potting mix with water – avoid spraying - before use to minimise the amount of dust generated.

• Use in Well-Ventilated Areas: Work outdoors or in well-ventilated spaces to disperse any airborne particles more effectively.

Practice Good Hygiene

• Hand Washing: Thoroughly wash your hands with soap and water after handling potting mix, even if you wore gloves. This helps remove any bacteria that may have come into contact with your skin.

• Avoid Touching Your Face: Refrain from touching your face, especially the mouth, nose, and eyes, while handling compost to reduce the risk of transferring bacteria.

Storage and Handling

• Store Safely: Keep compost sealed in its bag and store it in a cool, dry place to reduce the chance of bacterial growth. Ensure you store out of direct sunlight. Do not store in greenhouses or indoors where there are warmer temperatures.

• Use Fresh Products: Use fresh potting mix and compost whenever possible, as bacteria can multiply over time in moist conditions.

• Countries such as Australia carry a warning label on all potting compost bags. They also have holes in the bags to prevent release of dust through excess pressure when opening the bag. The UK has yet to follow suit so opening the bag carefully in a well-ventilated area will also reduce the risk of potential exposure.

PPE

• Masks: Wear a face mask, such as a P2 (N95) mask, when handling potting mix or compost to prevent inhaling dust and aerosols that may contain the bacteria.

• Gloves: Use gloves to avoid direct contact with the compost, reducing the chance of transferring bacteria to the face or respiratory tract or infecting open wounds.

Awareness and Education

• Awareness: Be aware of the symptoms of Legionnaires' disease (fever, cough, muscle aches, and pneumonia) and seek medical attention promptly if sudden flu-like symptoms develop after exposure to potting mix or soil.

• Education: Educate others, particularly those at higher risk (such as the elderly and immunocompromised), about the risks and prevention measures associated with handling potting mix.

• Duty of Care for your Customers: Many care homes and hospital settings offer gardening as an activity to their residents – if you look after any of these settings ensure that a suitable risk assessment is in place and suitable measures are put in place to minimise any risks identified.

Conclusion

Although we are gradually seeing a rise in Legionnaires' disease caused by *Legionella longbeachae*, through awareness, continued surveillance and taking suitable steps - such as care when handling compost, regular handwashing and wearing suitable PPE - we can minimise the risks and protect ourselves and those around us.

INDUSTRY UPDATES

Health and Safety Executive

1. HSE published their Annual Business Plan in May: HSE Business Plan - HSE which details what work will be delivered in the period April 2025-March 2026, as well as details the progress made so far on the 2022-2032 Strategy. Within the plan, HSE have again committed to undertaking a small number of Legionella inspections to wet evaporative cooling system operators, to enforce clear, established expectations to prevent legionella outbreaks, gaining assurance that dutyholders are complying with the law.

2. In alignment with HSE strategic objective to enable industry to innovate safely, whilst supporting the move towards Net Zero, HSE Scientists and Specialists published a peer-reviewed paper to review the current literature on Legionella risks associated with heat pumps: Legionella in Hot Water Heat Pump (HWHP) Systems.

3. To share the lessons learned from previous incidents, HSE collaborated with UKHSA and relevant local authority colleagues to publish a peer-reviewed paper on a Legionnaires' disease outbreak associated with a domestic cold water system at a social housing scheme: *http://dx.doi.org/10.1017/S0950268825100113*.

FairHeat

The Heat Network Technical Standard (HTS1) is currently in development as a new technical standard to work alongside the Heat Network Technical Assurance Scheme (HNTAS) which is being established as part of the regulation of heat networks at the start of 2026. This new standard will be largely based on CP1 (2020) but will be written as a new standard.

As part of the production of this standard, there has been development of new materials regarding the water quality of heat networks which has included the engagement of specialist working groups, as well as the HNTAS Technical Sub-Committee.

The new materials regarding water quality will focus on the management, monitoring, and protection of systems' water quality. This includes incorporation of water quality key performance indicators (KPIs) which will be reported during the construction phase of a heat network, as well as in its operational lifetime, which will include requirements regarding the use of continuous monitoring of water quality parameters. There will also be technical requirements regarding the water quality equipment specified and installed on heat networks.

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CONTRACTS, PRODUCTS & PUBLICATIONS

Great British Energy to cut bills for hospitals and schools – Gov.UK PR

Hundreds of schools, NHS trusts and communities across the UK will benefit from new rooftop solar power and renewable schemes to save money on their energy bills, thanks to a total £200 million investment from the UK government and Great British Energy.

In another step forward for the government's Plan for Change, the Energy Secretary has announced the first major project for Great British Energy - a company owned by the British people, for the British people. It will immediately begin working with schools, the NHS, and devolved governments to install solar panels, build local clean power and bring down energy bills.

In England around £80 million in funding will support around 200 schools, alongside £100 million for nearly 200 NHS sites, covering a third of NHS trusts, to install rooftop solar panels that could power classrooms and operations, with potential to sell leftover energy back to the grid. The first panels are expected to be in schools and hospitals by the end of summer 2025, saving schools money for the next academic year.

Schools and hospitals have been faced with rocketing energy bills in recent years, costing taxpayers millions of pounds, and eating into school budgets. This has been driven by the UK's dependency on global fossil fuel markets. The NHS is the single biggest public sector energy user, with an estimated annual energy bill of £1.4 billion, that has more than doubled since 2019.

Great British Energy's first investment could see millions invested back into frontline services, targeting deprived areas, with lifetime savings for schools and the NHS of up to £400 million over around 30 years. Estimates suggest that on average, a typical school could save up to £25,000 per year, whilst the average NHS site could save up to £45,000 per year on their annual energy bill if they had solar panels with complementary technologies installed such as batteries.

In addition, local authorities and community energy groups will also be supported by nearly £12 million to help build local clean energy projects - from community-led onshore wind, to solar on rooftops and hydropower in rivers – that can help drive growth. These could generate profits which could then be reinvested into community projects or take money off people's bills. A further £9.3 million will power schemes in Scotland, Wales and Northern Ireland including community energy or rooftop solar for public buildings.

To see the full Press Release go to:
https://www.gov.uk/government/news/great-british-energy-to-cut-bills-for-hospitals-and-schools

Who are ONVO? Where have they come from and what are they doing next?

Founded in 2018 by industry veterans Alex Bond, Dale Dunbar, and Lewis Bond, ONVO Modular Ltd has been redefining hand washing solutions with innovative designs and revolutionary technology. What started as a company supplying solid surface washtroughs and accessories to the education sector has since grown into a leader in the healthcare and mental health sectors, with a commitment to providing seamless, high-quality, and functional products.

In its early days, ONVO's mission was clear: to create exceptional washroom solutions that would meet the needs of educational institutions. Initially, the company focused solely on supplying washtroughs and accessories to the education sector, a market where durable, aesthetically pleasing, and functional products were in high demand.

In 2024, ONVO's commitment to innovation reached new heights. The company received a patent for their Cliniwash system and launched a collaboration with Pineapple at the DIMH exhibition. This partnership combined expertise from both companies to create the ultimate reduced ligature solid surface basin and toilet system.

To further complement their healthcare offerings in the acute sector, ONVO launched the Modular IPS) and Scrubwash systems at Healthcare Estates 2024. This allowed the company to offer a comprehensive IPS package for healthcare projects, solidifying its position as a leading supplier of complete washroom solutions.

In early 2025, ONVO made a significant move by relocating their fabrication business from Buckinghamshire to new premises in Cheshire. This has brought everything under one roof will allow the company to streamline operations, improve customer service, and accelerate product development. This is a major step forward, one that will enable ONVO to bring innovative products to market faster and continue its growth trajectory.

Additionally, ONVO joined the Future Health Spaces Innovation Hub, a collaboration with other industry experts focused on creating worldclass, hygienic healthcare facilities. This initiative further demonstrates ONVO's commitment to thought leadership and pushing the boundaries of innovation in the healthcare space.

As ONVO continues to grow, its journey is a testament to the power of innovation, strategic partnerships, and a strong commitment to quality. From humble beginnings in the education sector to becoming a leader in healthcare and mental health solutions, ONVO's story is one of continual evolution and progress.

With a strong foundation built on ingenuity and customer-focused solutions, ONVO is well-positioned for even greater success in the years to come. As they continue to expand into new markets and develop cutting-edge products, one thing is certain: ONVO will continue to lead the way in providing the best washroom solutions for every sector they serve.

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www.onvo.com

Rise in unlicensed wells and boreholes on West Country farms – Environment Agency PR

Farm inspectors are finding a lot of unlicensed abstraction taking place in Devon and Cornwall during routine farm inspections. Many farms rely on their own private water supply from springs, wells, and boreholes. How much water is being taken is unmonitored – meaning farmers could be unknowingly breaching the allowed limit for abstraction without a licence.

Lisa Best, agriculture team leader for the Environment Agency in Devon and Cornwall, said: "All landowners should know how much water they are abstracting and ensure they have the relevant licence if needed. Abstracting water without the necessary licence or in breach of your licence conditions is an offence and could lead to enforcement action."

"Taking more water than you are permitted could impact on other users and damage the environment. The Environment Agency controls how much, where and when water is abstracted through our licensing system. Anyone taking 20 m^3 of water per day or over is required to have an abstraction licence. Environment Agency farm inspectors have issued 70 actions to farmers over the past 2 years to install a meter to monitor how much water is being taken and apply for a licence where it is clear one is needed."

"Abstraction licences have conditions on them to ensure the environment, and the rights of other abstractors are protected. Our powers and duties enable us to regulate the use of water under existing licences and to decide whether to grant new ones. Where abstraction is damaging the environment, we also have the power to amend or revoke existing licences."

"Climate change and population growth means there will be less available water with a greater demand for it. By 2050, the amount of water available could be down by 10-15%, with some rivers seeing 50-80% less water during the summer months. We all need to protect the environment by reducing the amount of water we use and ensuring greater efficiency in its use and re-use."

Guidance on whether you need a licence to abstract water is available on GOV.UK. Grant funding is available for rainwater storage tanks. See RP16: Rainwater goods, RP17: Storage tanks underground, RP18: Above ground tanks. You do not need an abstraction licence to use water that only consists of harvested rainwater. See our regulatory position on rainwater harvesting.

9th May HSE Biocide eBulletin

This edition contains information on regulating biocides in Northern Ireland (NI).

Upcoming EU active substance dossier submission deadline

Take action to keep your active substance in the EU Review Programme. The active substance/product type combination listed has been successfully notified into the EU Review Programme following an open invitation. The next step is for a full active substance dossier to be submitted to the European Chemicals Agency (ECHA) by the following deadline. This affects NI:

16 April 2026; Hydrogen peroxide (CAS 7722-84-1 EC 231-765-0) in product type 11. Only the person, company or task force/consortium that successfully notified the active substance/product type combination listed can submit a dossier. If this active substance/product type combination is important to you, consider contacting the notifier to let them know. You may even be able to join them in supporting the active substance.

Check the ECHA list of notifications; If a dossier is not submitted by the deadline, this active substance/product type combination will be subject to an EU non-approval decision. This means the active substance will no longer be able to be used in biocidal products of the relevant product type in NI. In addition, articles treated with such products will no longer be able to be placed on the market in NI. HSE will provide separate updates on these where relevant.

New EU active substance renewal decision

New expiry date. Following evaluation under the EU BPR, a decision has been taken to renew the active substance listed with the following new expiry date. This affects NI:

30 November 2031; Dinotefuran (CAS 165252-70-0 EC 605-399-0) in product type 18. Take action to remain on the EU Article 95 List. If you are an EU Article 95 supplier of the active substance/product type combination listed, you must submit all the data, or a letter of access to all the data, relevant for the renewal by 31 March 2026 to remain on the list. Check the impact on your products. If you supply biocidal products containing this active substance in the relevant product type in NI, you should check the renewal conditions to see how you may be impacted.

There may be new conditions that you need to take account of when applying for product authorisation or renewal under EU BPR, or product approval under the Control of Pesticides Regulations (COPR). You may even need to make a change to your existing authorisation or approval to comply with the renewal conditions. Some conditions may mean we need to contact you about cancelling or revoking your product authorisation or approval. In such cases, you will have an opportunity to submit comments or additional information, and we will take account of these when finalising our decision.

HSE ebulletin service: hse@public.govdelivery.com

Global Water Solutions Anti-Legionella Flow-Thru Tanks – Case Study

Edinburgh College – Midlothian Campus serves 200 students daily and operates a potable water system with a total capacity of 2,200 litres. This system utilizes two 1000-litre hot water calorifiers, supplied by McDonald Water Storage. The water to the site is supplied by Scottish Water at 3 bar pressure. The college faced a need to ensure compliance with water safety regulations and mitigate the risk of Legionella. To that end, they recently upgraded its infrastructure by installing Global Water Solutions' Anti-Legionella Flow-Thru Tanks. This case study outlines the successful implementation, highlighting improvements in efficiency, compliance, and safety.

System Configuration and Installation

- Hot Water Calorifiers: Two 1000-litre calorifiers connected to the destratification pumps and insulated pipework, showcasing the integration of the new system
- Temperature Management: Weekly thermal disinfection which raises water temperatures from 60 °C to 67 °C
- Pressure Regulation: A Pressure Reducing Valve (PRV) set at 3 bar
- Flow-Thru Tanks: Two GFU-170LV Anti-Legionella Flow-Thru Tanks installed on the cold-water main incomer, just before the calorifiers. The GFU-170LV tanks are easily identifiable with clear IN and OUT connections. Their compact design facilitates straightforward installation and maintenance.
- Control Systems: The monitoring setup ensures compliance with HSE recommendations, enabling realtime tracking of temperature and flow.

Key Benefits and Results

- Improved Water Safety: The Flow-Thru tanks enhance circulation, eliminating stagnation and dead legs where Legionella bacteria might proliferate. Legionella testing has consistently returned negative results since installation.
- Enhanced Efficiency: The new system delivers hot water more effectively, with the furthest sentinel tap reaching the required temperature within the risk assessment timeframe. This improvement ensures water is safe and available without delays.
- Compliance with Regulations: The upgraded system meets the HSE: HSG274 Part 2 recommendations, ensuring a consistent approach to water safety and compliance.
- Operational Simplicity: The FM team from Vital Energy remarked on the ease of installation and integration of the Flow-Thru tanks, which did not require any significant alterations to the existing risk assessment activities.

The installation of Global Water Solutions' Anti-Legionella Flow-Thru Tanks at Edinburgh College – Midlothian Campus has proven to be a resounding success. The upgrade has significantly enhanced water safety, operational efficiency, and compliance with health and safety regulations. Notably, there have been no positive Legionella test results since the installation, establishing the system as a benchmark for best practices in water management across educational institutions.

"The Flow-Thru™ tanks were very easy to install with just a simple IN and OUT connection. Following the upgrades, the hot water supply delivery is far better than before, and the furthest sentinel tap now gets to the required temperature within the time set by the Risk Assessment and Water Safety Group. Edinburgh College is now fully compliant with HSE's recommendations in HSG274 Part 2 and has significantly increased the efficiency of its hot water supply."

Testimonial from Vital Energy.

Contact www.globalwatersolutions.com for further information.

Legionella longbeachae infection - including symptoms, treatment, and prevention

From SA Health, a department of the Government of South Australia.

Many different species of bacteria called Legionella are commonly found in the environment and some of these are known to cause illness in people. Infection by Legionella causes a disease known as legionellosis. Legionella longbeachae infection is a notifiable condition.

Legionella longbeachae (L. longbeachae) can be found in potting mixes, compost heaps and composted animal manures. How L. longbeachae are spread is uncertain, but it is thought that they are breathed in or spread from hand to mouth. The bacteria can remain on hands contaminated by handling potting mix for periods of up to 1 hour. They can be readily removed from the hands by washing. Legionella infection cannot be caught from other people or animals. The risk of L. longbeachae infection is not limited to gardeners, but the use of potting mixes, composts and other soils puts them at greater risk.

L. longbeachae generally causes infection of the lung (pneumonia), which is a severe illness. Symptoms of Legionella infection may include fever; cough; chest pain; breathlessness; diarrhoea. People of any age may be infected, but the disease is more common in middle aged and older people and people whose immune system is weak. Men are affected more frequently than women. Risk of infection is increased by smoking; chronic heart or lung disease; diabetes; kidney failure; some forms of cancer; immunosuppression, especially if on steroid medication; being 50 years or older.

Diagnosis of Legionella longbeachae infection is usually made by a series of blood tests. The bacteria may sometimes be grown from a sample of sputum (phlegm) or lung fluid or detected using other special tests. The incubation period (time between becoming infected and developing symptoms) is 2 to 10 days, usually 5 to 6 days. There is no infectious period (time during which an infected person can infect others); Person-to-person spread does not occur.

Treatment for Legionella longbeachae infection; antibiotic treatment may be prescribed by the treating doctor. Some cases may require admission to hospital.

Prevention of Legionella longbeachae infection: Exclusion from childcare, preschool, school, or work is not necessary.

To minimise the risk of exposure when handling garden mixes (bagged or unbagged) such as potting mix, mulches, composts and garden soils, gardeners should take the following precautions: read the warning on bagged mixes and follow the manufacturer's instructions; avoid inhaling airborne particles such as dust or mists; avoid hand-to-mouth contact; open bagged mixes in a well-ventilated space; moisten the garden mix, avoiding the inhalation of airborne particles; always wash hands after using garden mixes, even if gloves have been worn; store bagged mixes in a cool dry place. Additional measures that can be taken to reduce risk include wearing a face mask and gloves.

19th May HSE Biocide eBulletin

This edition contains information on regulating biocides in Great Britain (GB).

GB active substance expiry dates postponed until 2027

This applies to biocidal active substance/product type combinations which expire between 1 January 2024 and 31 December 2026. The active substance/product type combinations are able to be postponed providing a timely renewal application has been submitted and accepted.

HSE provided information about the decision to postpone expiry dates in a previous ebulletin. The requirements have now been met for the following active substance/product type combinations:

30 September 2026 to 31 January 2027; Glutaral (glutaraldehyde) (CAS 111-30-8 EC 203-856-5) in product types 2, 3, 4, 6, 11 and 12

31 October 2026 to 31 January 2027; Polyhexamethylene biguanide hydrochloride with a mean number-average molecular weight (Mn) of 1415 and a mean polydispersity (PDI) of 4.7 (PHMB (1415;4.7)) (CAS 1802181-67-4 / 32289-58-0 EC N/A) in product type 2

If you want to supply new biocidal products containing these active substances, you can still apply for GB BPR product authorisation. New products (including new trade names) must not be supplied in GB until product authorisation is granted. HSE will provide separate updates on the renewal decisions and future expiry date postponements captured within this overall decision when relevant.

HSE ebulletin service: hse@public.govdelivery.com.

Water professionals encouraged to take action for change

Water sector professionals need to use their expertise "to be the agents for change." That was the message coming from a keynote delivered by Natalie Prosser, chief executive of the Office for Environmental Protection (OEP), at British Water's 2025 Spring Reception.

Speaking at the event, hosted at the House of Lords in London on 1st May, she said, "You are the do-ers in the industry, you are on the frontline, and understand better than most what needs to happen. My message is to use that knowledge to be agents for change, for a water system that we can be proud of, that is resilient for the future, which delivers for both people and nature. Now is the time to act."

Prosser outlined and reiterated broader criticisms the OEP had made of the water sector for insufficient investment, generic improvement plans, a lack of certainty and pace, and clear deadlines, and inadequate governance, when it came to achieving and maintaining high water quality.

The keynote also reflected on the Independent Water Commission, which is due to report its findings on the water sector later this year. The OEP calls for any revised targets to be ambitious, long-term, legally binding, apex targets, which specify the outcomes to be achieved on the environment. Prosser said "These [targets] should be pursued through specific and time-bound delivery plans accompanied by active review. The OEP emphasises the importance of clarity and coherence for how different regulations, policies and targets relate to each other."

Over 200 guests attended the Spring Reception, including representatives from member companies, water company leaders and other key industry figures. The event, which takes place annually, was hosted by Lord Wei of Shoreditch. The peer told attendees, "I know the industry has a lot to answer for, but I also know there are many doing such a great job too. The UK has some of the best drinking water in the world. My challenge to you is to have more storytelling in the industry." Lord Wei said that he assumed innovation was occurring in the water sector but felt that it was not widely known. He suggested that if companies took the risk to show the public the inner workings of the sector, that they might see wider support from the public, which would make "[your] lives a lot easier."

Opening proceedings, Lila Thompson, chief executive of British Water, announced that Mark Fletcher, British Water chair, would be stepping down after three years in post. She said, "I want to take this opportunity to say what a fantastic chair Mark has been to work with. He is a very influential, inspiring leader and it has been really a privilege for me personally to work with him." Fletcher said, "British Water is on a sound foundation and a real trajectory for growth and success under Lila's excellent leadership. We've continued to grow our impact, our membership, our financial stability."

Now in its eighteenth year, the British Water Spring Reception continues to raise the profile of the UK water industry and gives the supplier community a valuable opportunity to build the professional networks that will help address sector challenges.

Issued on behalf of: British Water, www.britishwater.co.uk, T: +44 (0)7931 554 873, British Water, Unit V124, Vox Studios, 1-45 Durham St, London SE11 5JH, UK.

Veolia Water Technologies facilitates expansion of Pharmaceuticals Manufacturer – Press Release

After purchasing Veolia Water Technologies' new ORION™ 2000S RO and CEDI unit, a major manufacturer has been able to significantly expand its production capacity and reduce its water footprint by up to 40%. The customer already has an existing ORION™ 4000S unit, which has provided an excellent level of performance, reliability, and sustainability. As such, Veolia Water Technologies was the clear choice to provide a new system.

The facility in the southeast of England already produces a range of consumer healthcare goods but was seeking to expand its production capabilities to include a range of allergy relief products, of which water is a major component. To achieve this, the customer needed to expand its capacity for the production of pure water that would comply with US pharmacopoeia standards.

An ORION™ 4000S has previously been used to supply the purified water required for the manufacturer's existing site. When a system was needed for the new facility, the customer felt confident reaching out to Veolia Water Technologies for a solution. The team recommended an ORION™ 2000S to match the reliability and sustainability of the existing unit, providing an additional 2000 L/hr of purified water.

The ORION™ series, developed for the pharmaceutical and cosmetics industry, uses a combination of pretreatment, reverse osmosis (RO) and continuous electro-deionisation (CEDI) technologies to deliver high-purity water for a variety of applications. The system can be regularly hot water sanitised above 80°C, offering preventative microbial protection over the system's long lifespan. The ORION™ S is the most sustainable model in the range as it incorporates features that reduce energy and water consumption and optimise water recovery, enabling the system to significantly reduce the volume of water sent to drain. The ORION™ S also delivers a highly energy efficient solution, with maximum performance and minimal OPEX costs. This also facilitates a lower environmental impact, providing a potential 30% reduction in CO_2 released during operation. The technology itself is constructed using materials that have a 99% recyclable potential, facilitating effective reuse when it reaches the end of its long service life.

Veolia Water Technologies commented: "It's been a pleasure to be involved with this project. Working with those that know and trust our products is always great, but it is particularly rewarding to be able to build on a relationship with a new piece of technology that will continue to reliably deliver, as the existing unit has, for many years to come. We have been perfecting the ORION™ for many years evolving its capabilities and we are excited to see the tangible benefits it will bring to the customer's business."

To find out more about the ORION™ range and how Veolia Water Technologies can optimise your production or reduce resource consumption, go to: www.veoliawatertechnologies.co.uk.

LIA: Your Trusted Partner for Scientific Consumables

We're not your average scientific consumables supplier. We focus on you, our partner, placing you at the heart of everything we do. LIA: Leading. Innovative. Agile. We're a service-led organisation dedicated to providing you with bespoke solutions that address your specific needs. We solve your supply problems, ensuring you get what you want, when you want it.

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Our Mission is to disrupt and exceed industry standards, empowering our partners to achieve more. We achieve this by:

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Providing exceptional support with a fast, flexible, and personalised approach.

Our Values are:

Customer Centricity: Your success is our priority. We build long-term relationships by providing positive experiences and solutions to your problems.

Integrity: Honesty and respect are at the core of everything we do. We are accountable and trustworthy.

Curiosity: We embrace a "can-do" mindset, constantly seeking innovation and improvement.

Teamwork: Collaboration is key. We are resilient, we win as a team, and we find joy in achieving growth for both our partners and ourselves.

Hear what our customers are saying:

"We have recently taken on board LIA International to supply so key elements for our microbiological analytical process. From the start the communication and quality of service have been excellent and deliveries have always been on time with no issues. An added bonus is that systems have been put in place to guarantee our supply of key products which other suppliers have not been able to do. I would recommend LIA to other laboratories." Director – Water Contract Laboratory

"LIA are always friendly, helpful, efficient, and always at the end of the phone to assist. They respond quickly to any queries we have and are very good at sourcing products for us at competitive prices." Purchasing Manager – Laboratory Supplies Distributor

"LIA go the extra mile to get even the smallest order dispatched quickly and your attention Lee is always welcome…it's easy and fun to deal with you." Director – Water Treatment Company

"Good, fast, and cheap; they say in business you can't have all 3, but LIA prove to be an exception. Competitive prices, fast postage, and friendly customer service are all reasons I will not only continue to order with LIA but also recommend them to others in my industry." Technical Manager – Water Treatment Company

Contact information: LIA International Ltd, Unit 9, Langley Business Court, Oxford Road, Beedon, Newbury, RG20 8RY, +44 (0)1488 686777, admin@liainternational.co.uk.

Join us at Safe Net Zero 2025 – HSE Training and Events

25 and 26 November, Kimpton Charlotte Square Hotel, Edinburgh: HSE is bringing together key hydrogen stakeholders to share knowledge and experiences at Safe Net Zero 2025.

This year, the theme of this event is 'safety considerations for the production and large scale storage of hydrogen and its derivatives.'

What to expect from the event

In the Autumn 2024 Budget, the UK government announced further investment in hydrogen production and infrastructure, bolstering confidence for those working in this area. To make Great Britain a safe, green energy superpower, new hydrogen production and storage projects need to build in safety from the start, whilst existing ones need to continue to manage safety risks effectively throughout the project lifecycle.

To help industry, government and academia achieve this, HSE is once again bringing together key hydrogen stakeholders to share knowledge and experiences, so that together they can ensure the safe development and roll out of hydrogen technologies.

Conference sessions: The 2-day programme of safety-focused thought leadership and the latest technological insights from several major UK and international projects producing and storing both hydrogen and its derivatives is built around the following sessions:

- the international picture
- large scale hydrogen production and storage in the UK
- research and innovation
- options and challenges for large-scale storage
- standards and guidance
- principles and good practice

Speakers include representatives from across industry, government, and academia.

Access the latest confirmed agenda and secure your delegate pass on our website.

Sponsorship opportunities: We have a limited number of sponsorship and exhibition opportunities available which provide an excellent platform to raise your organisation's profile at this event. With packages to suit all budgets, your presence will allow you to showcase your products and services, engage with our delegates and generate new leads.

Hydrogen training from HSE: An understanding of hydrogen's physical properties and behaviours is key to safely developing and deploying it as a net zero energy vector. Our one-day 'Hydrogen: The fundamentals' course helps delegates to understand and identify the hazards hydrogen could pose to their own environments and intended uses. Visit our website to view available dates and find out more information about Hydrogen: the fundamentals. *https://www.hsl.gov.uk/health-and-safety-training-courses*

Legionella setback for delayed Galliford Try health centre

A health centre in Worthing being built by Galliford Try has been hit by further delays after fresh traces of legionella bacteria were detected in its water supply.

The cost of the Worthing Integrated Care Centre (WICC) is expected to top £45m in the wake of the latest complication, up from the original estimate of £34m four years ago.

Due to have been completed in 2003, the centre has been dogged by delays in the project build, as well as inflationary pressures and supply chain issues.

Galliford Try eventually handed over the keys to WICC last December to allow NHS services to move in, Worthing Borough Council said.

However, that process was derailed by the discovery of legionella in the water supply during tests carried out by managing agent Savills. Traces of legionella had been detected before the building was handed over, but the building was declared safe to occupy after chlorination and flushing by Galliford Try.

Tenants from the Sussex Community NHS Foundation Trust, Sussex Partnership NHS Foundation Trust and Worthing Medical Group were not prepared to enter into their leases after the bacteria was rediscovered, the council said. "Unfortunately, that process is proving difficult to complete, despite us doing everything we can to safely speed activity up, although it is not uncommon for traces of legionella to be found in the water systems of new buildings, the bacteria is still being detected at the WICC more than two months after the initial discovery. We're now bringing all of those involved – the NHS tenants, Galliford Try, (developer) West Sussex (Worthing) Ltd and our managing agent, Savills – together to encourage them to urgently find and agree a solution to the problem."

The council said it had been left out of pocket because it was losing out on rental income as well as being obliged to meet the running costs of the new facility. At a council meeting in April, members agreed to increase the budget for the project to almost £46m to allow the scheme to be completed. The budget includes specialist inspection of the building, and any legal costs needed to protect the council's contractual interests, according to a paper prepared for the meeting by Chris Maughan, assistant director for regenerative development. "Although the council has the contractual ability to recover liquidated damages from the developer for delays to full practical completion at the set rate of £22,366 per week under the development agreement, the full extent of recovery under the contract is still to be determined," Maughan said.

Scarborough Hospital introduces robot-assisted triage system

NHS staff at Scarborough Hospital's Emergency Department have recently welcomed a new 'colleague' – a research robot called DAISY.

DAISY, which stands for Diagnostic Artificial Intelligence System, is a pilot prototype humanoid device, designed to assist with the initial clinical triage assessments when patients attend the Emergency Department. The aim is to explore whether DAISY's advanced digital technology can enhance these processes. The system provides instructions to patients on how to use medical equipment to measure their own vital signs. DAISY will ask patients a series of health-related questions, gathering important data such as symptoms, body temperature, and pulse rate. All the date is then analysed and compiled into a clinical report, intended to support staff in their assessment of the patient.

York and Scarborough Teaching Hospitals NHS Foundation Trust emphasises that DAISY does not replace any routine care, and that at this stage the research pilot is designed to simply assess DAISY's functionality and compare its assessment to that of a clinician.

The project is being led by Dr Ol'Tunde Ashaolu, Emergency Medicine Consultant at the Trust, alongside Professor Radu Calinescu from the University of York's Department of Computer Science and Institute for Safe Autonomy. The pilot is being supported by the Trust's Research and Innovation Team who will investigate the social, legal, ethical, empathetic, and cultural concerns surrounding the use of artificial intelligence and social robotics in healthcare, while working closely with both clinicians and patients to address the challenges associated with the integration of this technology.

Dr Ashaolu explained: "Evidence shows patients survive more and live better lives when their ailments are identified and treated at the earliest stage. This device represents an important first step towards the development of a solution for automating key stages of the emergency department triage process, potentially reducing waiting times and clinical workload."

Developed in partnership between the Trust and the University of York, the six-month research pilot has been made possible thanks to a charitable legacy left to the Trust by Elsie May Sykes, managed through York & Scarborough Hospitals Charity.

Celebrating 140 Years of Innovation – Johnson Controls

This year, we proudly celebrate 140 years of innovation. Founded in 1885 by Warren Johnson, who revolutionised building performance with the invention of the first thermostat, we have consistently led the way in creating smarter, more efficient buildings. Our commitment to innovation and excellence has made us a global leader in building technology and solutions. Join us as we reflect on our rich history and look forward to a future filled with ground-breaking advancements.

With every breakthrough, we have shaped the spaces where people live, work, learn, and play - introducing the first automatic sprinkler, the first building automation system to optimise efficiency, the first air-conditioned commercial building for comfort, and the first security panel with a remote arming keypad to enhance safety.

From these historic milestones to transforming the future of buildings with award-winning AI technologies, we continue to set new standards and push the boundaries of what's possible.

Innovation is in our DNA. With more than 8,000 active patents and over three billion dollars invested in engineering, research, and development in the last 10 years, Johnson Controls is redefining the future of buildings. Our innovations continue to transform industries and improve lives.

At the heart of everything we do are our people - the passionate and talented individuals who bring their expertise and dedication to every challenge we tackle. The trust our customers place in us, and our ability to solve even the most complex problems, continue to inspire us every day.

As we celebrate 140 years, we remain focused on what lies ahead - shaping the evolution of buildings, leading the industry forward, and powering our customers' missions.

Johnson Controls International plc is an American, Irish-domiciled multinational conglomerate headquartered in Cork, Ireland, which produces fire, HVAC, and security equipment for buildings. As of 2024, it employed 94,000 people in around 2,000 locations across six continents.

Cistermiser welcomes Ofwat's £100m Water Efficiency Fund

Cistermiser, a leading UK provider of water and energy saving management solutions, says it welcomes the launch of Ofwat's £100 million Water Efficiency Fund 'as a crucial investment in securing the UK's future water supply'. It says that the fund, designed to accelerate water-saving innovations and initiatives, 'represents a significant step in addressing water scarcity and improving sustainability across homes and businesses.'

With non-household water use accounting for a substantial proportion of demand, Cistermiser is urging decision-makers to prioritise proven technologies that deliver immediate and measurable savings.

The company says its range of commercial washroom products supports the prevention of constant water flow and a reduction of water usage in commercial buildings. MD, Richard Braid, explained "We strongly support Ofwat's Water Efficiency Fund and its potential to drive meaningful reductions in water usage. However, innovation doesn't have to be complex; smart solutions like our infrared urinal controls and sensor-activated WC dual flush are designed to prevent costly leaks and offer businesses a simple yet effective way to reduce water waste and enhance sustainability. If the UK is serious about addressing water shortages, we must embrace proven, readily available technologies alongside new innovations."

Cistermiser says that toilets are 'a major, yet often overlooked,' source of water waste. The Waterwise Leaky Loos report estimates 1.5 million leaking toilets across the UK, each wasting up to 400 litres daily – enough to fill four million bathtubs. The main culprits – Cistermiser says – are failing flush valve seals, faulty fill valves, and dual flush issues.

The company added: "This preventable problem fuels the UK's water crisis, but innovation offers a simple solution. Cistermiser's EasyflushEVO, is a revolutionary siphonic dual flush valve that eliminates leaks by removing the vulnerable below-waterline seal, reducing failures from debris, scale, and wear."

Cistermiser can be contacted at: https://www.cistermiser.co.uk/contact.

Opening of Sample Drop-off Point in Birmingham by Cheshire Scientific

We are pleased to announce that we have opened a sample drop-off facility in Birmingham.

Conveniently located in Oldbury – equidistant between junctions 1 and 2 of the M5 motorway and located within 'Storage Giant', Oldbury (B69 4JN) – our new facility is ready to receive samples between 08:00 and 15:00 Monday to Friday. Simply call the office to arrange a drop-off and our Bookings team will talk you through the simple process.

New fridges and cool boxes await receipt of potable, Legionella and closed system water samples, and there is plenty of storage for non-liquid samples too. Simply book the samples in with our Bookings team (0151 343 1280), visit the unit, let yourself in, complete the analysis request form and deposit this together with your samples in a provided sealable bag, and then place in either a fridge, a cool box or on a shelf ready to be collected by one of our drivers in our own refrigerated/ temperature-controlled vehicles. Then simply lock the unit door and leave the building. Give us a call to confirm you have left your samples and we'll take care of the rest.

It's a simple process to follow and we hope the location will prove beneficial for both existing and new customers who are sampling in the Midlands and South West. As long as samples are booked with the office by 12:00 and dropped off before 15:00 they will be collected the same day. It's a convenient and fuss-free way of ensuring speedy collection and delivery of your samples to our laboratory.

The address is: Unit 1B001, Storage Giant, Stone Street, Oldbury, B69 4JN.

Contact us today to arrange a drop-off and see how well this works for you – 0151 343 1280 / info@cheshirescientific.co.uk.

For more information please visit our new website: https://cheshirescientific.co.uk.

Study: A rapid test can be used to detect E. coli from drinking water

Microbial quality of drinking water is monitored by indicator bacteria including fecal E. coli. Traditional enumeration methods to detect E. coli require 1-2 days to produce results. Gómez et al. (2025) were able to reliably detect E. coli in drinking water within six hours by utilizing RNA marker detection method in EU laboratories. Rapid method allows timely interventions in contamination events and can help to prevent waterborne outbreaks.

E. coli are common bacteria present in the guts of warm-blooded animals. It does not survive outside the gut for long periods of time, which makes it a good indicator of recent fecal contamination. Fast detection of fecal contamination in the drinking water distribution systems is important in prevention of infections caused by fecal pathogens, such as norovirus, campylobacter, or salmonella. RNA marker analysis is a valid tool to detect living bacteria from water, as RNA degrades quickly when the cell dies. Living and active cell needs RNA for all its' functions and produces it actively. Abundance of RNA in active cells enables the detection of RNA marker.

RNA marker analysis was validated in two interlaboratory studies with 19 laboratories from different EU countries. Laboratories were able to follow the provided procedure, although not all were familiar with the method. However, results delivered on the second round were of better quality, highlighting the importance of practice when introducing new methods. The RNA marker analysis showed 91% sensitivity, which is slightly lower in comparison to the 97% sensitivity of the traditional method. Although the rapid method was slightly less sensitive than the traditional method, it provides a valid tool for drinking water monitoring. Quicker method enables quick reactions to contamination events and helps to prevent waterborne outbreaks. With training and practical experience, the sensitivity of the rapid method can be increased.

Application of a real-time reverse transcription polymerase chain reaction for rapid detection of Escherichia coli in drinking water: an EU representative study.

Environmental Research, 279, 121786. https://doi.org/10.1016/j.envres.2025.121786.

Are we prepared for a drought? The water resilience challenge – Environment Agency Blog

With summer approaching and after several months of dry weather, many are wondering if the country is facing a potential drought. After an exceptionally wet 2024, this year has taken a dramatically different turn.

There's a reason we like to talk about the weather in this country; there's always something to talk about. Whilst last year brought much more rainfall than average, with parts of Oxfordshire and Gloucestershire experiencing their wettest year on record, this year has pivoted sharply:

Rainfall data from the Met Office shows that this was the driest February to April since 1956 in England. It has been the driest March across England since 1961, with only a quarter of the long-term average (LTA) recorded in England. Rainfall for England in April was half of the long-term average.

It has been particularly dry in northern England: April was the fourth driest across north-east England on record dating back to 1871. Parts of Cumbria and Northumbria have had their driest start to the year since 1929.

Soil moisture levels have decreased significantly. River flows dependent on rainfall in hard rock (also known as impervious) areas, have fallen sharply.

Wildfire incidents are above average due to hot, dry conditions. Current water resource status varies significantly by region. In general:

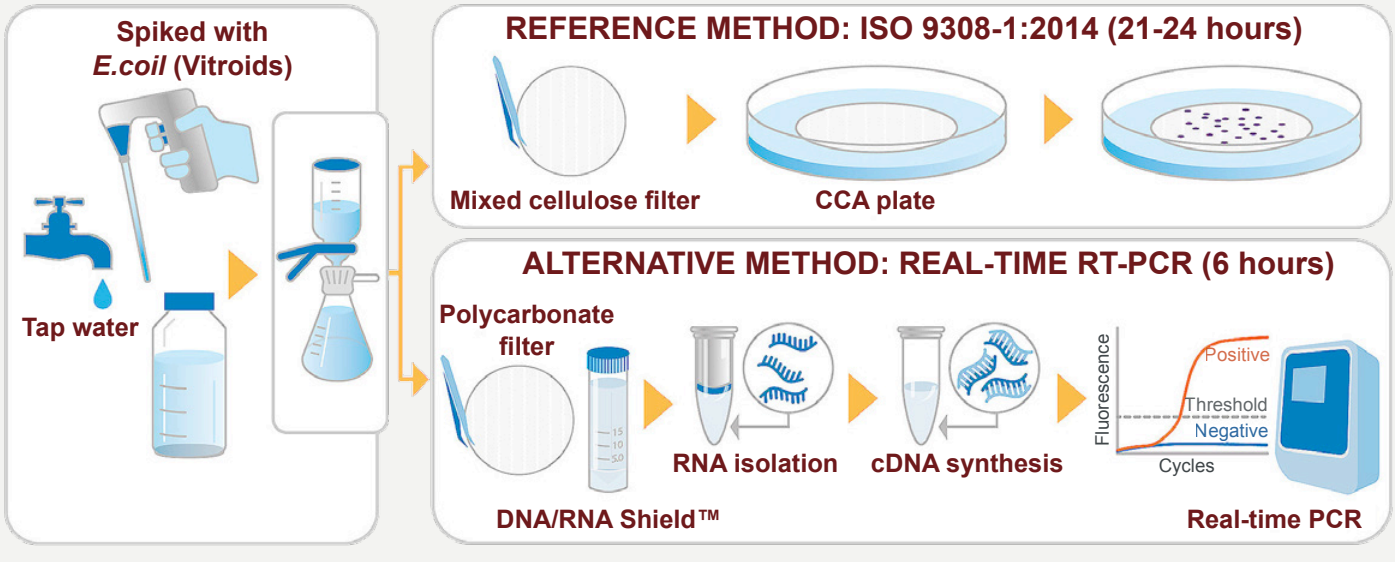
Central and Northern England: Rivers and public water supply reservoirs are lower than normal, with levels dropping earlier than typically expected, whilst Southeast and Eastern England River flows remain generally normal, supported by healthy groundwater reserves.

How is the Environment Agency responding? The National Drought Group, chaired by the Environment Agency, met on 7 May to coordinate the strategic management of drought across government, regulators, industry, and stakeholders. Key actions the Environment Agency is taking include:

Enhanced monitoring of river, groundwater, and reservoir levels; Close coordination with water companies to implement statutory drought plans when necessary; Reinforcement of water abstraction licence compliance; Environmental incident response for low river flows; Management of/for fishery operators.

Water companies have drought plans to manage periods of dry weather and drought. These plans set out the actions a water company should take at different stages of a drought. Such actions include increasing the communications to customers, helping customers use water wisely during these dry periods as well as taking action themselves by reducing leakage, optimising their supply network and, if needed, implementing customer restrictions through temporary use bans (often referred to as hosepipe bans).

The full blog, including details of new reservoirs planned, is available at: https://environmentagency.blog.gov.uk/2025/05/07/are-we-prepared-for-a-drought-the-water-resilience-challenge/.



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An interview with... Michael Grimshaw

We sat down with one of our members, Michael Grimshaw, to discuss his career journey and experience of upgrading his WMSoc membership through the CPD route. Here's what he had to say:

Describe your career journey so far
I started out as an electrical apprentice and became fully qualified in 2010. The pathway I was on was electrical design, contracting, and engineering, but due to the recession, I was made redundant. I then joined another company and began working in the maintenance world. I found this to be an eye opener, as even though it was a route I hadn't planned to go down, I quickly realised that it was a really good industry to work in. We were based in a regional office in Blackburn, overseeing hundreds of contracts, all varying in size and industry, so the exposure was really good.

In 2013, I was then promoted to Technical Supervisor and I began to oversee more than fifty mobile contracts, so I was completely FM (Facilities Management) maintenance from that point. My experience became much more expanded as I was learning about all of the disciplines that need looking after, and from this I took a particular shine to water management. In 2012, the industry had not been exposed to the technical guidance, such as HSG274, but we were carrying out Legionella control and water hygiene services across those contracts, so it just built my experience. I also gained exposure to the PFI (Private Finance Initiative) world, and the challenges that we encountered, like hospital contracts, were a really good learning experience.

Starting in 2014, I spent a couple of years in contract improvement. They would 'parachute' me into contracts, whether that was me supporting with technical compliance, mobilisations, demobilisations, hard FM deliverables, I was going from contract to contract to help. I ended up working in London a lot during this time, in the heritage sector, so museums etc. It was good to come from the North West and go to London and see what the FM world was like down there. I gained so much experience in this role, and this, of course, overlapped with the rollout of HSG274 Parts 1,2, and 3. I was acting as a contract improvement technical manager, and the industry received this new technical guidance update, so it was my role to implement the changes and ensure the company was compliant with all these changes.

Then, in 2016, I joined the Central Technical Team, and that's where I still work now. Essentially, we support all of our operational teams throughout the UK. Once I was in this role, I started to work on cooling towers from a compliance perspective, and I was able to get a good amount of experience across our industrial contracts which was quite good. This lead to my appointment as Water Authorising Engineer (AE) in 2017, and even though my core discipline was electrical, I wasn't appointed as Electrical AE until 2019. From my appointment as Water AE in 2017, I've been a co-author of the water hygiene safety rules and Legionella control safety rules. Then, when I was fortunate enough to apply for the Lead AE role in 2022, and I was appointed to this role in January 2023.

I would say my favourite part of my current role is supporting people. If there's an issue in operations, for example, some of the FM managers may not be that technical, so they won't understand what they need to do to fully comply with legislation and technical guidance. Being the person that people come to for this is good as I can help people!

For the last few years, I've been dealing with contracts from the Midlands up to Scotland, but over the last few years we've enhanced our technical teams capabilities in Scotland, so now I'm just focusing on the North of England. This is great as it allows me to focus more on the local contracts, rather than just dropping in. We're there on a regular basis, building relationships with the ops team, which allows them to be more open and ask questions. Sometimes, asking an AE to come to site can be daunting, but due to these relationships, they know that we're on the same team.

Why did you initially join the Water Management Society?
I wanted to join a professional institution for water management. I was already a member of the IET (Institution of Engineering and Technology), being an AE for electrical systems, so I wanted to have something similar for water, and I knew that the Water Management Society had really good resources.

I also felt that there was an element of me wanting to prove myself. Coming from an electrical background, but now being an AE for water systems, I felt that it was a good thing to do – the knowledge I can gain from being a member has only enforced my role level. I also asked other peers who had been members, and they all told me about the benefits of the society, as well as

the process of joining, and I just felt that now was the right time to join.

What do you think are the main benefits of WMSoc membership?
Since joining, I've been on two of the courses. I found the training to be really detailed, and technical, and having done lots of training in the past from other organisations, I felt that the WMSoc was one of the best I've had. I chose a few topics that I needed to improve on, and the vast range of training options made it easy. I thought the facilities were really good, too.

It's great exposure to events and networking, and also the technical resources. I find that if I'm on the train, going from site to site, I'll read some of the technical resources whilst I travel and I always find them to be so good.

Another thing is the ability to ask questions to the Technical Committee, and they always come back to me really quickly. It's often questions that we're discussing as a team internally, and I felt that I wanted to have some external viewpoints, so I asked the Technical Committee. Having that there is brilliant.

I've also read Waterline, and one of my favourite things is that you get to see what other people in the industry are dealing with, any innovations, or other issues.

It's only been a short time that I've been a member, and these are only the resources that I've tapped into so far, but it's great. I'm also looking forward to attending events and having the opportunity to network with other likeminded individuals. I feel like networking is one of the best things you can do – every day is a learning day. One of the best forms of knowledge is gained by listening to people and understanding through conversation with people who have actually dealt with similar issues.

I've also done a webinar, the NHS NTM Technical Bulletin Update, and I thought it was great. Hearing how the WMSoc interpreted the HTM update was really interesting, because we're the people that are expected to issue internal updates and we have to know how to go about that with our clients, so those webinars are good.

Why did you decide to upgrade?
I joined at associate level, and this allowed me to tap into the WMSoc guidance and resources. I still felt like I needed to get more CPD and go through the CPD assessment process due to not having a degree level qualification in order to get Full membership. So once I had the correct CPD, I felt that my membership level should reflect that.

What was the process of upgrading via the CPD route like?
I gained my CPD very quickly, but it wasn't just to upgrade, it was for my professional development. I tried to tap into as many different ways to gain CPD as I could, whether that was reading Waterline or going on training courses.

Getting awarded a Full membership made me really happy! I feel like I'm a really driven person, and even though I haven't gone down the university route, to put my experience on paper and have people say 'that is good enough' to be a Full member shows that my hard work has paid off.

What would you say to anyone who is thinking of upgrading?
Go for it! Prove what knowledge and experience you have, and tap into as many different avenues of knowledge and training as you can. Make sure you're involved with the WMSoc and all that they offer and it will be worth it - it was for me, and I've only been a WMSoc member for a short time!

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> Since switching to LIA International, we've seen a significant improvement in both communication and reliability. They've resolved the lead time and communication issues we previously struggled with and consistently provide high-quality products, including bespoke solutions when needed. Their team has gone above and beyond to support our needs, often bending over backwards to ensure deadlines are met and expectations exceeded.
>
> From day one, LIA demonstrated a true commitment to collaboration. The team have shown a real commitment to partnership, making them a trusted, valued and key supplier. We're very pleased with the relationship and would gladly recommend them.

Technical Manager, Water Treatment Service Provider

www.liainternational.co.uk 01488 686777 sales@liainternational.co.uk

event report

SoPHE Northern Region Annual Dinner

Friday 9th May 2025, Royal Hotel, Manchester

The Society of Public Health Engineers (SoPHE) hosted its Northern Region Annual Dinner on 9th May 2025 at the Royal Hotel, Manchester. This prestigious networking event brought together over 90 professionals from across the public health engineering sector, including representatives from consultancies, contractors, manufacturers, and supporting organisations. The Water Management Society was represented by Chair, Jemma Tennant.

The evening was formally opened by SoPHE Chair, Mike Carter, who delivered an engaging keynote speech. He reflected on SoPHE's ongoing achievements and growth, highlighting that the society now boasts over 1,000 members and 60 industrial associates. Particular praise was given to Malcolm, SoPHE's long-standing events coordinator, for his efforts in organising the dinner and numerous CPD events throughout the year—24 in total, attracting over 800 participants.

The address also focused on SoPHE's increasing influence within CIBSE, the success of its 2025 technical symposium on water scarcity and neutrality, and exciting expansion plans both in the UK (Midlands and Scotland) and internationally (Far East and Middle East).

As part of SoPHE's 21st anniversary celebrations, attendees were introduced to a special initiative in partnership with the charity *Village by Village*. The initiative will offer the winner of the SoPHE YEN competition the opportunity to travel to Ghana and support local communities with water and education projects.

The evening continued with light-hearted entertainment from well-known comedian Mike Osman, bringing laughter and energy to the night. The atmosphere throughout was one of camaraderie and collaboration—qualities that remain at the heart of SoPHE's continued success.

With several upcoming events including summer networking sessions, a Young Engineers Network gathering, and the highly anticipated black-tie London Dinner in the winter, SoPHE's calendar remains as vibrant and ambitious as ever.

INDUSTRY UPDATES

United Kingdom Health Security Agency (UKHSA)

UK Health Security Agency

First detection of West Nile virus in UK mosquitoes
A research programme by the UK Health Security Agency (UKHSA) and the Animal and Plant Health Agency (APHA) has identified fragments of West Nile Virus (WNV) genetic material in mosquitoes collected in Britain for the first time.

West Nile Virus is a vector borne disease belonging to the Flaviviridae family, which also includes the viruses that cause dengue and yellow fever. It is usually found in birds, and typically circulates through bird-biting mosquitoes. In rare cases mosquitoes can transmit the virus to humans or horses.

The fragments were detected through the Vector-Borne RADAR (Real-time Arbovirus Detection And Response) programme by APHA, using polymerase chain reaction (PCR) testing, in 2 samples of Aedes vexans mosquitoes collected by UKHSA from wetlands on the River Idle near Gamston (Retford), Nottinghamshire, during July 2023. The mosquitoes were pooled into groups of 10 for testing, and fragments of West Nile Virus genetic material were identified in 2 of the pools. The other 198 were negative. This is the first evidence of West Nile Virus detected in a mosquito in the UK. A further 198 pools from the same site tested negative for the virus.

West Nile virus (WNV) is endemic in various regions across the globe, including Europe, Africa, the Middle East, West and Central Asia, and North America, as well as South America, USA and Australia. The geographic range of West Nile Virus has expanded in recent years to more northerly and western regions of mainland Europe.

The UKHSA has assessed the risk to the general public as very low, but is issuing advice to healthcare professionals so that patients with encephalitis of unknown cause can be tested as a precaution through UKHSA's Rare and Imported Pathogens Laboratory.
Find out more on the gov.uk website.

Also from the UKHSA...
Cryptosporidium data 2014 to 2023
Main points
The 2023 report shows that:

- the number of reported Cryptosporidium cases in England rose from 3,739 cases in 2022 to 6,837 cases in 2023, an increase of 3,098 cases (82.9%)
- the region with the highest number of Cryptosporidium laboratory reports was the North West with 1,384 reports, this was also the region with the highest reporting rate at 18.2 per 100,000 population
- overall, 55.4% of Cryptosporidium laboratory confirmed cases in England were female
- the age group with the highest number of laboratory reports was children aged 9 years or younger with 31.0% of total reports
- consistent with the previous 5-year median, in 2023 the number of Cryptosporidium reports peaked in the month of September

Read the full report here:
https://www.gov.uk/government/publications/cryptosporidium-national-laboratory-data/cryptosporidium-data-2014-to-2023

The Chartered Institute of Plumbing and Heating Engineering (CIPHE)

CIPHE

The Chartered Institute of Plumbing and Heating Engineering (CIPHE) has released its 2025-2027 manifesto, outlining its priorities for the plumbing and heating industry. The manifesto addresses key challenges and proposes actions across four main pillars:

1. Education: Tackles the skills crisis by improving apprenticeships, licensing, and low-carbon training and accreditation.
2. Sustainability: Promotes sustainable practices in new builds and retrofits to achieve net-zero targets.
3. Conservation: Addresses water shortages, labelling, pollution and fuel and water poverty, advocating for responsible water management.
4. Safeguarding: Emphasises the protection of consumers, both at home and in public spaces, by addressing issues like scalding and the availability of public toilets.

CIPHE is calling for collaborative action from the government, industry stakeholders and the public to drive positive change and ensure a sustainable and safe future. Read the manifesto here:
https://www.ciphe.org.uk/campaigns/our-2025-2027-manifesto/

UKAS

As part of their continued commitment to evolve and expand the UKAS Academy, they are delighted to announce the launch of a brand-new range of online learning packages: Accreditation Essentials. These new eLearning offerings are a tangible outcome of their commitment to equipping all learners with high-quality, accessible tools – wherever they are on their accreditation journey.

These online courses provide a way for learners to connect with the principles, practices and purpose of accreditation in a flexible and accessible format.

Find out more on the UKAS website:
https://training-academy.ukas.com/lmt/clmsLearningPathDetails.prMain?site=ukas&in_region=gb&in_learningPathId=44701710

The Cooling Tower Specialists

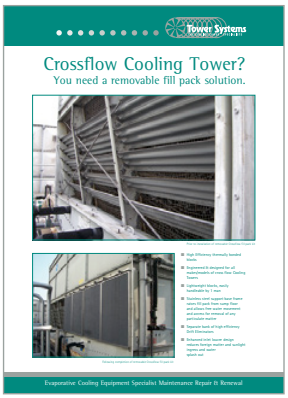
Stay cool, we're on top of it.

Tower Systems

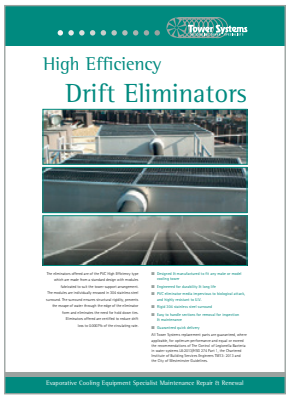
What we do: Products and Services

New Equipment/Turnkey Installation Solution

Removable Crossflow Fill Pack Solution



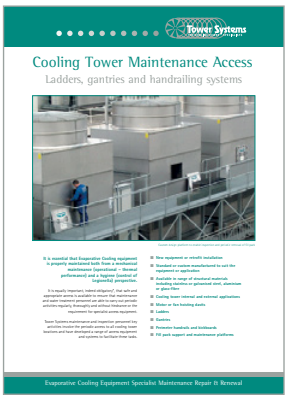
High Efficiency Drift Eliminators



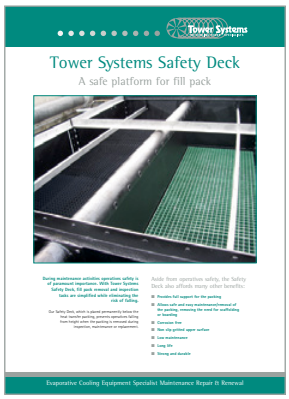
Routine Maintenance Visits

Replacement Parts

Maintenance Access



Safety Deck

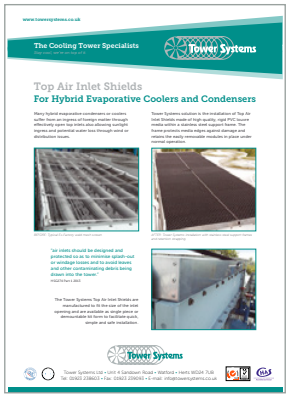


Condition Surveys

Refurbishment

Leak Repairs

Top Air Inlet Shields



Cooling Tower Air Intake Mesh

Tower Systems Ltd • Unit 4 Sandown Road • Watford • Herts WD24 7UB
Tel: 01923 238603 • Fax: 01923 239093 • E-mail: info@towersystems.co.uk

Accredited Contractor

Committee roundup – Summer 2025

Events Committee
WMSoc have just returned from our **summer event** 'Are Counter Measures Counter Productive' at Cranfield University. It was a sell-out and the feedback has been excellent! Look out for a full report in the next issue of Waterline.

We have already hosted several **webinars** which are free for members and the recordings are available on the members area of the website. A CPD certificate was sent out to all attendees who attended the live session. This year's include:

- NHS NTM Technical Bulletin Update
- International Women's Day "Women in Water"
- Water Regulations , kindly hosted by Welsh Water
- LRA Executive Summaries and Written Schemes

The next one is planned for Friday 19th September and will focus on Legionella risk assessments in Dental practices. We are always looking for subject matter for webinars so please let *admin@wmsoc.org.uk* know if there is anything that you would specifically like to see.

The **Golf Day** was held on June 26th and will reported on in the autumn edition.

WMS Council members and the Secretariat have also been actively supporting and/or attending **external events** such SPATEX in Coventry, where a packed free CPD session was provided. They also attended the Legionella Control Association meetings in Scotland, Tamworth, and London, and ChemUK in Birmingham. Please come and see us at the CIBSE event on 19th June, Measuring Performance and Facilities Management: *https://www.cibse.org/whats-on/cibse-measuring-performance-and-facilities-management/*, and Healthcare Estates in October *www.healthcare-estates.com*.

Waterline Committee
Well what incredible weather we are having this Spring! I do hope this doesn't mean we will be having a wet Summer! The reservoirs are already starting to look low but I'm sure we will have rain soon. We hope you found the Spring Edition interesting with great articles on the direct experience of a WMSoc Member using air source heat pumps, and another article highlighting disinfectant resistance. Could this cause problems in the future? The Waterline Committee continue to work hard at pulling together exciting and educational topics for this year's editions. We encourage every member to send in articles or case studies for review and inclusion into the Journal.

The Summer edition is covering *Legionella longbeacheae* and we hope you find this hot topic of interest.

The Digital Waterline has undergone some improvements to make it easier to access this site and it is agreed that we would like the digital waterline to be merged into the main Water Management Society website to make it easier to access by our members. We encourage you all to go onto the digital site as you will find additional articles and industry updates to those published in the journal.

The Waterline Committee are continuing to form a close collaboration with the American Association of Water Technologies (AWT) and we are looking to share articles between each organisation and publish these in the Waterline Journal on an ongoing basis.

The "Weird and Wonderful" Grime Scene competition is in full flow and we are loving seeing all the photographs you are sending in. Due to loads of fabulous pictures arriving this month, we have held some back for the Autumn edition as well so please do not be disappointed if not all your photographs have appeared in this Edition. Again, we would like to encourage everyone to send in photographs of systems or designs of pipework, etc that "blow your mind". The weirder the better!

Have yourselves a really great Summer and lets hope the lovely weather continues!

Pam Simpson, Waterline Committee Chair

Training and Accreditation Committee
The WMSoc training provision recently underwent its annual audit with City & Guilds, which was passed without any actions arising.
An agreement has been formed with a not-for-profit organisation located in Australia whereby we share knowledge and some training material. This has benefits to the WMSoc in generating expanded members from the Australia, but also contributes to the raising of standards in Australia, as well as mutual learning.

We continue to make enhancements to the water systems in the Practical Training Area (PTA), this enables us to ensure the training courses are able to provide the most 'real' scenarios in the classroom.

Further works for this year include adding enhancements and updates to the WMSoc series of on-line courses available.

Technical Committee
The Technical Committee (TC) has a new Chair, Graham Thompson, who would like to thank the previous chair Ian Kershaw for their time and effort and wish him the best of health for the future.

The TC steering group backed a suggested tweak to the TC structure, with a core steering group and 5 sub-groups broadly based around services, products and sectors. The purpose of the sub-groups is to allow the TC to expand significantly but remain dynamic. As is protocol the TC asked the WMS council to approve the suggested changes. Work continues on several toolbox talks including risk assessing expansion vessels, inspecting cooling towers and what are NTMs, look out for these over the next few months. New toolbox talks are planned on defining LRA Executive summaries, Sampling plans for non-high risk hot & cold water systems and guidance on a suitable and sufficient risk assessments for dwellings (houses, flats etc).

Generating 'domestic' hot water in environmentally more acceptable ways, has seen sudden reactions from the active members of the WMS, HSE release and now needs assembling into an article for waterline on just what is being published, along with the potential consequences.

Steady numbers of questions are submitted from the members, hopefully usefully answered, and some remind us to tweak toolbox talks and other guidance.

2025 TRAINING PROGRAMME

THE WATER MANAGEMENT SOCIETY

FEB.	4th	W259	Temperature Monitoring, Sampling & Inspection of Hot & Cold Water Systems For Technicians (P)
	11th	W249	Healthcare Awareness ***NEW!***
	12th	W250	Legionella Control & Management for Dutyholders & Responsible Persons - Hot & Cold Water Systems
	25th	W252	Water Treatment Chemistry Foundation
	26th	W257	Cleaning & Disinfection of Hot & Cold Water Systems (P)
MAR.	4th	W265	Practical Legionella Risk Assessment Hot & Cold Water Systems Advanced (P) *
	5th	W266	Legionella Risk Assessment of Evaporative Cooling Systems (P)
	18th	W251	Legionella Control & Management for Dutyholders & Responsible Persons - Evaporative Cooling Systems
	19th	W259	Temperature Monitoring, Sampling & Inspection of Hot & Cold Water Systems For Technicians (P)
	25th/26th	W264	Legionella Risk Assessment of Hot & Cold Water Systems Foundation (P) ***2 DAY COURSE!***
	27th	**W300**	**Legionella Risk Assessment Hot & Cold Water Systems EXAM**
APR.	1st	W260	Steam Boiler Operation, Water Treatment & Chemistry
	2nd	W268	HTM 04-01 Water Hygiene Training: Managing & Controlling Risk of Waterborne Pathogens in Healthcare Water Systems (P)
	8th	W257	Cleaning & Disinfection of Hot & Cold Water Systems (P)
	9th	W258	Cleaning & Disinfection of Evaporative Cooling Systems (P)
	10th	**W313**	**Water Treatment Steam Boilers EXAM**
	29th	W250	Legionella Control & Management for Dutyholders & Responsible Persons - Hot & Cold Water Systems
	30th	W265	Practical Legionella Risk Assessment Hot & Cold Water Systems Advanced (P) *
MAY	1st	W259	Temperature Monitoring, Sampling & Inspection of Hot & Cold Water Systems For Technicians (P)
	7th	W255	Evaporative Cooling Water Chemistry Foundation
	8th	W276	Practical Monitoring & Control of Water Quality in Closed Systems (P)
	13th/14th	W264	Legionella Risk Assessment of Hot & Cold Water Systems Foundation (P) ***2 DAY COURSE!***
	15th	W275	Management of Water Quality in Closed Systems ***NEW!***
	20th	W270	Legionella Risk Assessment of Other Risk Systems
	21st	**W301**	**Legionella & Pseudomonas Risk Assessment Healthcare EXAM**
JUN.	3rd	W265	Practical Legionella Risk Assessment Hot & Cold Water Systems Advanced (P) *
	4th	W256	Evaporative Cooling Water Chemistry Advanced *
	17th	W252	Water Treatment Chemistry Foundation
	18th	W257	Cleaning & Disinfection of Hot & Cold Water Systems (P)
	19th	**W310**	**Water Treatment Hot & Cold Water Systems EXAM**
	25th	W250	Legionella Control & Management for Dutyholders & Responsible Persons - Hot & Cold Water Systems
JUL.	1st	W258	Cleaning & Disinfection of Evaporative Cooling Systems (P)
	2nd	W259	Temperature Monitoring, Sampling & Inspection of Hot & Cold Water Systems For Technicians (P)
	8th/9th	W264	Legionella Risk Assessment of Hot & Cold Water Systems Foundation (P) ***2 DAY COURSE!***
	10th	W265	Practical Legionella Risk Assessment Hot & Cold Water Systems Advanced (P) *
	15th	W266	Legionella Risk Assessment of Evaporative Cooling Systems (P)
SEP.	2nd/3rd	W264	Legionella Risk Assessment of Hot & Cold Water Systems Foundation (P) ***2 DAY COURSE!***
	9th	W259	Temperature Monitoring, Sampling & Inspection of Hot & Cold Water Systems For Technicians (P)
	10th	W265	Practical Legionella Risk Assessment Hot & Cold Water Systems Advanced (P) *
	11th	**W300**	**Legionella Risk Assessment Hot & Cold Water Systems EXAM**
	16th	W250	Legionella Control & Management for Dutyholders & Responsible Persons - Hot & Cold Water Systems
	17th	W252	Water Treatment Chemistry Foundation
	18th	W257	Cleaning & Disinfection of Hot & Cold Water Systems (P)
	23rd	W255	Evaporative Cooling Water Chemistry Foundation
	24th	W276	Practical Monitoring & Control of Water Quality in Closed Systems (P)
	30th	W275	Management of Water Quality in Closed Systems ***NEW!***
OCT.	1st	W251	Legionella Control & Management for Dutyholders & Responsible Persons - Evaporative Cooling Systems
	7th	W258	Cleaning & Disinfection of Evaporative Cooling Systems (P)
	8th	**W312**	**Water Treatment Closed Systems EXAM**
	14th/15th	W264	Legionella Risk Assessment of Hot & Cold Water Systems Foundation (P) ***2 DAY COURSE!***
	16th	W265	Practical Legionella Risk Assessment Hot & Cold Water Systems Advanced (P) *
	21st	W260	Steam Boiler Operation, Water Treatment & Chemistry
	22nd	W257	Cleaning & Disinfection of Hot & Cold Water Systems (P)
NOV.	4th	W266	Legionella Risk Assessment of Evaporative Cooling Systems (P)
	5th	W270	Legionella Risk Assessment of Other Risk Systems
	12th	W268	HTM 04-01 Water Hygiene Training: Managing & Controlling Risk of Waterborne Pathogens in Healthcare Water Systems (P)
	18th	W250	Legionella Control & Management for Dutyholders & Responsible Persons - Hot & Cold Water Systems
	19th	W259	Temperature Monitoring, Sampling & Inspection of Hot & Cold Water Systems For Technicians (P)
	25th/26th	W264	Legionella Risk Assessment of Hot & Cold Water Systems Foundation (P) ***2 DAY COURSE!***
	27th	W265	Practical Legionella Risk Assessment Hot & Cold Water Systems Advanced (P) *
DEC.	2nd	W257	Cleaning & Disinfection of Hot & Cold Water Systems (P)
	3rd	W252	Water Treatment Chemistry Foundation
	4th	W276	Practical Monitoring & Control of Water Quality in Closed Systems (P)

WHERE INDICATED (P) COURSE WILL USE THE WMSOC PRACTICAL TRAINING AREA

PTA PRACTICAL TRAINING AREA

** Delegates attending an advanced course should first attend the corresponding foundation course or have equivalent knowledge.*

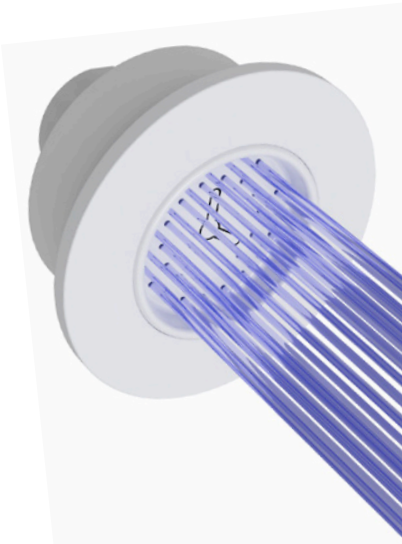
It is generally agreed that training should be refreshed on a regular basis; WMSoc recommends that training is refreshed every 3 years. The WMSoc has replaced its refresher courses with revamped training modules using the Practical Training Area (PTA); this gives attendees the opportunity to prove an ability to follow instructions and demonstrate their ability to work safely under test conditions. Anyone who attended training more than 3 years ago would benefit from attending a course currently shown on the programme to refresh their training.

ALL OF OUR COURSES ARE PART OF

City & Guilds ACCREDITED PROGRAMME

Book online:
www.bit.ly/WMSoc-Learning
Call: 01827 289 558 or email: training@wmsoc.org.uk
The Water Management Society, Water House, Office 6, Fairway Court, Amber Close, Tamworth, B77 4RP

SafeFlush Showers .com



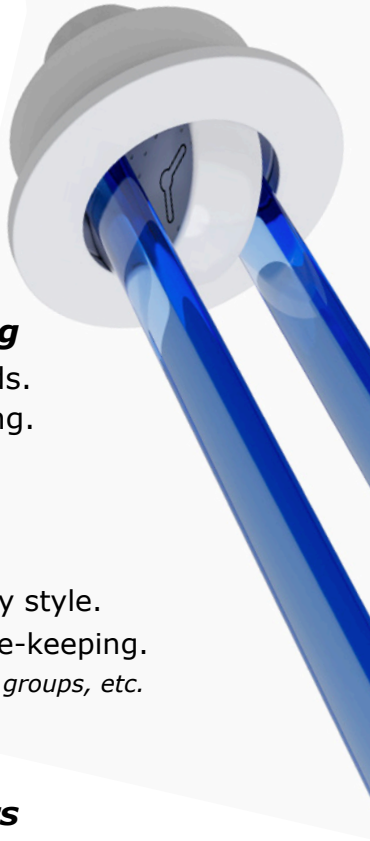
State-of-the-art Shower Heads

Legionella control - Strengthening the Weakest-link

Fundamental Design Breakthrough - Upgrading Control Procedures

SafeFlush - ***Avoiding compromised flushing***

| Twist unlock & flip spray plate open - Avoid restricting contaminated water flows & resulting legionella collection.
| Avoid - Attempting to compensate for legionella collection, by increasing flushing time & frequency.



EasyClean - *Avoiding cumbersome dismantling*

| Twist unlock - Flip spray plate open - Access in seconds.
| Surfaces sized & shaped - Supporting effective cleaning.

QuickAudit - *Demonstrating staff attendance*

| Unlock - Flip spray plate over - Alternating tracker display style.
| Tacker display style - Emphasising the importance of time-keeping.
Now available : Display style options for personalised branding - hotel groups, etc.

ReFreshFlip - *Promoting fresher hotel showers*

| Showers in regular-use - Flip spray plate over regularly.
| Exposing & killing legionella collected, naturally by desiccation.

More advanced legionella control functions & wider benefits -

| FastDry	Out-of-use showers - Avoiding slow-drying heads - Reducing limescale.
| ExSpray	Accessory - Reducing aerosol exposure - Flushing little-used showers.
| Sustainability	Avoiding legionella collection when flushing - Avoiding extending flushing.
| Promoting	The wiser & wider use of legionella control procedures - Healthier showering.
| Brand values	Demonstrating technical due-diligence - To staff and stakeholders alike.