

waterline

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**The Economic and
Environmental Case**
for Sustainable Water Management

**The Biocidal Products
Regulation (BPR)**
and water treatment

**The Authorising
Engineer (Water)**
Past, Present and Future?

PLUS

- Pipeline - Building on a sound foundation
- Appliance compliance
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THE WATER MANAGEMENT SOCIETY

AGM

2017

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WMSoc 38th AGM on Tuesday 13th June 2017

The Water Management Society's 38th Annual General Meeting will take place on Tuesday 13th June 2017 at the WMSoc Offices, Sir Robert Peel Mill Building, Hoyer Walk, Mill Lane, Fazeley, Tamworth, Staffordshire B78 3QD

10.30am – 1.30pm

All are welcome to attend the AGM but only WMSoc members may vote.

Programme

10.30 Registration

11.00 WMSoc AGM

- 12.00 Speaker - Dr Trevor James, Hon. Secretary of SAHS, Staffordshire Archaeological and Historical Society and Regional Representative of the Historical Association
- 12.30 Buffet lunch & optional tour of the Water Management Society's unique Practical Training Area
- 13.30 Council meeting (for WMSoc Council members only)

To reserve your place at the AGM lunch, please book online by **6th June 2017** at www.wmsoc.org.uk/conferences.php. **£25 + VAT** for members and **£30 + VAT** for non-members. If you wish to attend the AGM only, please contact WMSoc office by **6th June 2017** on: **01827 289 558** or email admin@wmsoc.org.uk.

Apologies If you will not be attending this year's AGM please email your apology to admin@wmsoc.org.uk by **6th June 2017**.

Visit the website for more information:



www.wmsoc.org.uk

Also includes:

Optional tour of the WMSoc Practical Training Area.



PRACTICAL TRAINING AREA

DISINFECTION
IN
PROGRESS

14



waterline

The Journal of the Water Management Society

Council of Management and Officers 2017

The Water Management Society is governed by a Council of Management which has the responsibility for the day-to-day supervision of operational and financial control. It meets bimonthly and the executive officers meet more frequently.

There is continuing cooperation and liaison between the Council and the Secretariat.

Council Members 2017

- Chair - Colin Shekleton
- IPC / Vice Chair - Elise Maynard
- Honorary Secretary - Sue Pipe
- Honorary Treasurer - Dr Andy Dobbins

- Dr John Alvey
- Howard Barnes
- David Bebbington
- Colin Brown
- Dean Francis
- Giles Green
- David Harper
- Simon Hughes
- Mike Hunter
- Garry Kerin
- Ian E Kershaw
- Dr Tom Laffey
- John Lindeman
- Dr Alan Pomfret
- Dr Bill Thomas
- Graham Thompson
- Geoff Walker

All Full members of the Society can apply for election to the Council. Elections are held at the AGM annually, and final selection is made (by ballot if necessary). Additional members may be co-opted. It only remains to be pointed out that the responsibilities and obligations of Council members require a clear and definite commitment in terms of time and effort.

waterline Editors:

- Executive Editors: G B Hill and G Walker
- General Editor: S D Pipe

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Designing Out

Healthcare Acquired Infections

Wednesday 15th November 2017

SCI, London

SW1X 8PS

1Day Event

Trade Stands
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Who should attend: Anyone with a direct or indirect interest in designing, installing, maintaining or looking after healthcare premises water systems and the products connected to them. Including architects, contractors, plumbers, manufacturers, hospital engineers, estates staff, infection control staff, microbiologists and any other members of water-safety groups.

Aim: One day conference aimed at understanding the needs of good design in healthcare buildings water systems and water-using products helping to reduce the current numbers of Healthcare Acquired Infections (HAIs)

for further info go to
www.wmsoc.org/conferences.php

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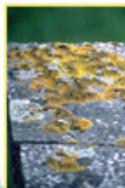
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Non Chemical Treatments - Buyer beware

Dear Sir

Incorrect treatment of cooling water can give rise to problems with scaling, corrosion, fouling and harmful bacteria. In recent years, Legionella awareness has improved significantly. Water treatment requirements for cooling water systems are well established; using combinations of pre-treatment of the make-up water, control of concentration factor (cycles), chemical treatments (corrosion and scale inhibitors, biocides and dispersants), filtration and cleaning. When correctly specified, applied, monitored and maintained these treatments can be successful in maintaining efficient and safe cooling systems. This type of control is backed up in documents such as HSG274 and WMSoc Cooling Water Treatment: A Code of Practice.

In recent years the pressure to consume less water and reuse water has increased, together with the green pressures to reduce or eliminate the use of chemicals. This has given rise to the promotion of a variety of "non-chemical" techniques, some of which have been available for many years and some that are new to the market. This has an appeal to the end user in improving their "green credentials", eliminating or reducing the use of hazardous chemicals, reducing operating costs or simply having the latest toy.

These non-chemical techniques are varied including:

- UV
- Magnetic
- Pulsed-power
- Electrostatic
- Ultrasonic Cavitation
- Hydrodynamic Cavitation
- Other "magic" treatments

This article makes no judgement as to the efficacy of any of these techniques.

Manufacturers' claims vary from complementing the established chemical treatments to eliminating chemicals totally. The ASHRAE Green Tip No. 14 lists the pros of one technique as follows:

- *The potential for lower bacterial contamination while providing scale and corrosion control.*
- *Lower energy and water use than in traditional chemical treatment.*
- *Blowdown water is environmentally benign and recyclable.*
- *Life-cycle cost savings compared to chemical treatment.*
- *Reduction or elimination of biofilm.*
- *Removes health and safety concerns about handling chemicals.*
- *Eliminates the environmental impact of blowdown, air emissions, and drift from toxic chemicals.*

It is difficult to argue that achieving these benefits isn't highly desirable for any operator of cooling systems but does it all sound too good to be true? The answer could simply be technology has developed leaving traditional treatments with the dinosaurs, but the question a buyer may ask is "how do I know this technology will work?"

Many non-chemical devices are accompanied with literature containing great claims but these are frequently based on in-house data with little or no peer review. The literature is often full of scientific terms which some would interpret as "pseudoscience" (Pseudoscientific explanations tend to be vague and ambiguous, often invoking

scientific terms in dubious contexts).

When considering non-chemical techniques a buyer needs to investigate the claims and not just take them at face value and consider the consequences of failure. In some cases it may be a low risk at little cost and thus seem worth a punt but in other situations the risk can be high.

Aspects the buyer should consider include changes to system operation (e.g. increased bleed), capital cost, operational cost, maintenance requirements, what monitoring can be carried out to ensure effectiveness, will the system fail safe? etc.

Consider explaining to site management or a customer the loss of production or cooling to a building due to scaling of a critical heat exchanger. Even worse, some failures could impact on people's health or even result in fatalities. In these cases the buyer has to be confident they can defend their decision to use such a technique under the scrutiny of the legal system and the man with the curly wig.

HSG274 Part1 includes alternative treatment techniques but caveats their use with "The owner/operator of the cooling system should verify that the proposed technique is suitable for the particular application". It should be noted that this requirement is on the owner/operator and not the supplier/manufacture (although HSG274 does detail duties of suppliers/manufacturers). Maybe a non-chemical treatment may be developed that can jump through all the hoops and become an established treatment technique for cooling towers but, until we have sufficient peer reviewed data, buyer beware!

*Dr Tom Laffey
Clearwater Technology*

waterlineonline

The **waterline** team are committed to communicating the latest news and updates to all our members. In addition to the printed distribution, **waterline** is available to members and subscribers in digital format through the Members Area of the WMSoc website.

Visit: www.wmsoc.org.uk click on 'My Account' and log in with your user details, once logged in, simply click on '**waterline** Publications' to view the latest edition of **waterline** online.

if you would like to get in touch with us contact us at
waterline@wmsoc.org.uk

PipeLine

by Sue Pipe, Editor

Building on a sound foundation

When we were discussing the possible topics for this article in committee, the suggestion was made that I should talk about back issues of **waterline** etc. This worries me slightly, as I began to wonder how many of my fellow **waterline** committee members actually read what I have written as I talked about this in the Autumn 2016 issue. However this did major on the terrific contribution made by one Gerald Hill to the attraction of the journal over the years, and, although Geoff Walker is waiting in the wings, GBH continues with extraordinary dedication to source his quirky and thought provoking items for **waterline**.

Just recently two historical issues of **waterline** have surfaced and I share with you some of the topics covered. In August 1971 under the guise of the CWA Newsletter [for Members of the Cooling Water Association – the originator of the WMSoc], two new members of Council were announced – Mr J.H. Leader of the British Oxygen Co. and Mr A.P. Arnold of J. Sainsbury Ltd and the AGM was attended by 38 members, it was held in conjunction with a luncheon and the Effluent and Water Treatment Convention at Olympia and the AGM was addressed by Mr Gibbs Slaughter a former President of the Cooling Tower Institute in the USA. A paper entitled "The efficient use of water in industry" was delivered by Mr. K.K. McKelvey of Ellis, McKelvey and Partners. The CWA had three working parties in existence: efficient use of water in industry; cooling tower performance and design; and cooling water treatment.

In later years a Cooling Water Group was set up by cooling tower manufacturers when cooling towers were receiving somewhat undeserved attention in the press and a London PR company was employed to redress the image. This group lasted for about 12 months, spent significant money, and achieved its aims. By December 1980, the CWA had broadened its scope and become the Industrial Water Society [IWS] in an attempt to assist the Company Secretaries who had suddenly been faced with huge bills for water consumed by their company. In searching for the most likely individual to lumber with the responsibility of addressing this problem, many companies hit on the cunning plan to delegate this to the electrical engineer, who knew very little about water apart from the fact that water and electricity should be kept apart [something obviously not appreciated by the Company Secretaries!]. From the outset the message of the Industrial Water Society was 'use every gallon of water that crosses the threshold to its maximum and then clean it up before discharging it to drain' and this has run through the activities of the IWS and WMSoc over the years with significant diversions into a matter of Legionnaires' Disease and other waterborne challenges.

The message from the chairman, John Lindeman, in 1980, said "The planned policy of broader activity in the field of water treatment and conservation has attracted applicants from all sides of industry and I am particularly pleased with the response from those who use industrial water." The original members of the CWA [mostly cooling tower manufacturers] had been joined by 75 other members from across industry. In May 1981 the IWS held a major conference 'Facts on Legionnaires' Disease', this was to be held at the IBA Conference Centre on the Brompton Road in London and more than 150 attendees were expected. If anyone else has back editions of **waterline** – especially the A5 versions and can spare them, I would be delighted to receive a few through the Secretariat and will share the topics covered and messages broadcast with you in coming issues.



Can You Be Sure of Quality Cleaning and Maintenance of Closed Heating and Cooling Systems?

There are standards documents from BSI and BSRIA but how can you be sure your service provider has systems in place to work to these high standards? The Closed System Control Association (CSCA) can assist you in ensuring quality of service.

The maintenance of water in Closed Circuit Heating/Cooling Systems is all too often a contentious subject, as fouling and corrosion problems are exacerbated by a number of factors both in the operation and in the supply and management of the water treatment particularly during the early life of such systems. The 'blame game' all too often results in expensive and vexatious litigation proceedings.

To address this problem, representatives from organisations including BACS, CSA, ICorr, Water Management Society and BSRIA have joined forces to devise and implement a registration scheme to recognise good management practice by the water treatment/chemical cleaning service providers.

Recommendations contained in the well-known BSRIA publications BG29 and BG50 together with British Standard BS8552 have been used by the group to assist in drawing up the scheme. When using CSCA registered service providers the owners and operators of closed systems are provided with a similar level of reassurance that (for example) the LCA has been so successful in ensuring for legionella control.

The CSCA is a non-profit membership organisation for companies who actively support and demonstrate a sound approach to the control of water quality in closed systems.

The registration is granted to service provider companies able to demonstrate that their approach to the management of water quality in closed systems is sound, well documented and complies with the published CSCA service delivery standards and code of practice.

Further information including registration application forms is available from:

www.cscassociation.org.uk



WMSoc Council News

Two meetings of the full Council of Management have taken place since the last report. In December 14 members of the 21 attended the meeting and the discussions were fast-moving and comprehensive. The conference 'Rapid microbiology – your questions answered' had been well-attended, had stimulated much interaction but had raised even more questions. It was hoped the Rapid Micro Working Group would continue to meet as the industry was obviously still in need of guidance. The Financial report indicated that a small surplus might be forth-coming although there was still a month to go before the end of the year. As a not-for-profit organization, this is in line with WMSoc policy. It was hoped that the Waterline website would go live at the end of January to coincide with the publication of the Winter issue. The Directors had been working for over 12 months on updating the Bylaws in line with current practices and the new version would be presented at the AGM in 2017. The review of the training courses was in hand and the upkeep of the PTA was constantly under scrutiny. The CPD scheme was developing well and further up-take was hoped for in 2017. The WMSoc and the LCA through the Technical Committee had submitted a response to the HSE on HSG282. The consensus was that the new document was not as good as the one that was being replaced. Working groups on oxidizing biocides for disinfection and one on rainwater harvesting have been set up, anyone wanting more information should make contact with the Tech Comm Chair via the Secretariat. 17 new memberships were confirmed by the Membership Committee following its normal lengthy deliberation. Following an increase in production costs, the advertising costs would be raised by 2%, with discounts for companies taking advertisements on the webpage. The WMSoc had been represented at 22 external events during 2016 with the banner stand being attended by the Secretariat supported by Council members. Reports were received from the LCA, CSCA and BACS.

The following meeting took place at the beginning of February and was attended by 13 of the 21 elected members and 2 members of the Secretariat. An attendance tracker is included at the end of every set of minutes. A number of very positive comments had been received on membership application forms and these were read out. Sadly Andy Dobbins has had to resign as Treasurer due to pressure of work and the search is on for a replacement. Council had benefitted from Dr Dobbins' expertise for a number of years and his input would be missed. It was proposed that the Guide to Legionella Risk Assessment be available for members to download from the website; this document had been revised recently by David Bebbington and Bill Thomas. There had been an end-of-year deficit when the final figures were assembled. This would be explained at the AGM when the Accountant had audited the Accounts. There had been a change in personnel on the Training Committee, following an extraordinary period of service to the WMSoc training courses that had transformed the financial stability and the standing of the Society, Council were very pleased to note that David Bebbington had stood down and the role of Chair of this committee was being undertaken by Geoff Walker. David Bebbington would continue to oversee the CPD scheme and serve on the committee. The Technical Committee was undertaking a full programme of work, the results of which would be reported in due course. 26 new memberships had been scrutinized by the Membership Committee and 3 members had upgraded their membership status. A Waterline editorial meeting precedes every Council meeting and this was reported at length. Reports were received from the LCA, BACS, PWTAG, BSI and CSCA. The AGM would take place at the WMSoc Offices on Tuesday 13th June with an optional tour of the Practical Training Area. Each Council meeting starts at 10am and concludes as close as possible to 1pm to enable Technical Committee to follow after lunch.

- Sue Pipe

UN WATER
22 MARCH
WORLD
WATER
DAY

OVER 80% OF OUR WASTEWATER FLOWS BACK TO NATURE UNTREATED.

March 22nd was World Water Day which this year focused on reducing waste and reusing waste water.

For more information, please visit:
www.worldwaterday.org

SAFELY MANAGED WASTEWATER IS A SUSTAINABLE SOURCE OF WATER, ENERGY & NUTRIENTS.

THE SDGs ARE INTERCONNECTED: GOOD WASTEWATER MANAGEMENT MEANS MORE CLEAN ENERGY, MORE SUSTAINABLE LIVING AND HEALTHIER ECOSYSTEMS.

USING DRINKING WATER FOR MUNICIPAL WASHING, CROP IRRIGATION OR INDUSTRIAL COOLING MAKES LITTLE SENSE.

USING SAFELY TREATED WASTEWATER TO GROW MORE FOOD PROTECTS FARMERS AND IMPROVES HEALTH & WELL-BEING.

THE COSTS OF WASTEWATER MANAGEMENT ARE GREATLY OUTWEIGHED BY THE BENEFITS.



The Economic and Environmental Case for Sustainable Water Management

By Colin Frayne,
CWT, Aquassurance, Inc.

INTRODUCTION

Water for potable, commercial, and industrial use is a limited resource; so limited in fact that—in the face of today's unprecedented global population growth, rates of infrastructural development and consumerism in BRIC (Brazil/Russia/India/China) and other newly industrializing countries—water has become the new energy!

In recent years, it has become increasingly expensive to obtain and treat, and also to dispose of after use—whether from the home, factory, or commercial building—due to the need to protect our environment from polluting discharges. For the most part, industry—both large and small, and especially in fully industrialized nations—has, for many years, been finding ways to reduce its water input requirements, and to recover and reuse water. This ongoing process has, in general, been primarily aimed at ensuring the continued survival and profitability of industrial corporations in the face of governmental antipollution and clean-water legislation, and the need to maintain competitive advantages in an increasingly global economy, rather than for any altruistic “green” rationale. Nevertheless, the application of sound business decisions for effective industrial water management has benefits in helping to sustain the natural environment and resources, and to curb the negative impacts of human involvement.

Building an economic and environmental case for sustainable water management in a global society requires us to look at some of what is currently being done around the world to reduce water consumption, and to recover and reuse water—especially in industry. But we also need to consider what lessons can be drawn by employing similar beneficial practices in other areas of the built environment, especially in commercial and institutional buildings, where up to 80 percent of all water consumed is employed as a heat-energy transfer vehicle for building space heating, ventilation, air conditioning, and refrigeration (HVAC®) purposes. The water is primarily used as makeup for cooling water systems, which employ cooling towers and evaporative condensers as the final stage in rejecting excess building heat-energy to the surrounding atmosphere. Thus, in this new era of limited water and high-cost energy sources, we also need to discuss the use of alternative, non-potable, and reclaimed water sources as a component of sustainable water management for commercial and institutional buildings. This, in turn, leads us to review basic water pretreatment and chemical treatment requirements, newer technology options, and the overall economics and practicality of such an undertaking.

The Current Global Environmental Position

The globally worsening position of limited, readily available fresh water supplies for potable, commercial, and industrial use will increasingly affect us all—even in the U.S., where certain States are currently blessed by an apparent abundance of available fresh water. The fact is, however, water has become increasingly expensive in recent years. This is in part due to increased competition for control over water supplies, extreme pressure on costs and expenditure priorities, pressure from LEED and other green initiatives, and increasingly tighter EPA rules. It is also a fact that there are other people in the developing world who now want the same things we have in the fully industrialized world! Water security is now a global issue, but we all have the same common problems around the world:

- Look at global population growth: UN efforts at stabilization have failed! The world is on target to reach 10 billion people by 2050.
- Look at our atmospheric overload! To keep pace with population growth, we now fix about twice as much nitrogen each year as all natural terrestrial processes combined (mainly Haber-Bosch), resulting in atmospheric N₂ overload, and tropospheric NO_x, O₃, particulates, and acid rain
- Look at our CO₂ emissions! CO₂ emissions worldwide are now topping 40 billion tons a year, with nearly 50% coming from high-income countries.

- Deforestation is another problem! We have lost much of our tropical hardwood forests and 50% of our global forests, and with it, an ability to absorb much of our CO₂ emissions!
- Additionally, as mentioned earlier, we face finite water supplies! Global water use is now in excess of 50% of total available supplies; withdrawal is reaching 90% (once-through use).

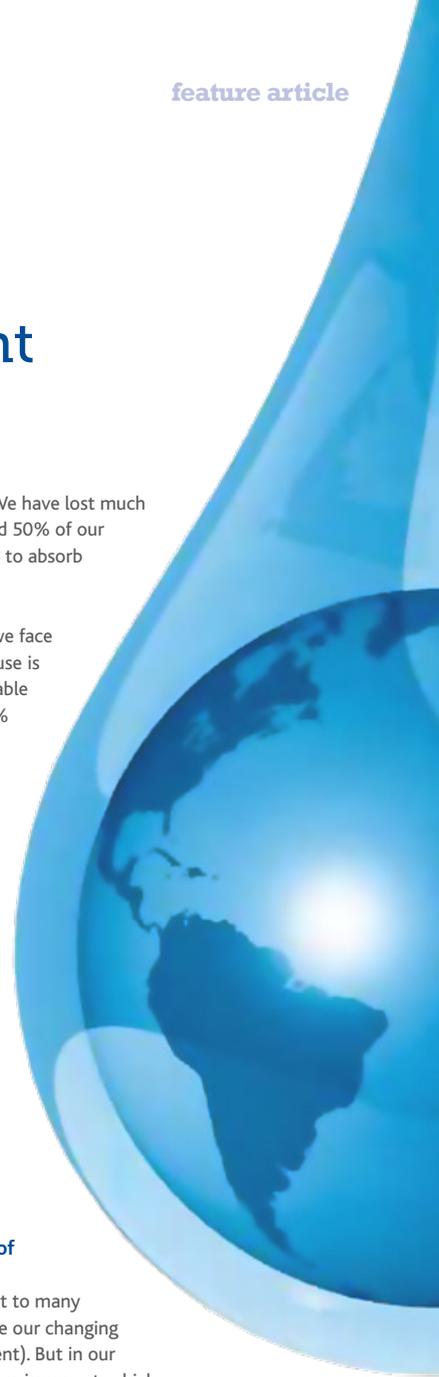
The current position on the global availability of fresh water supplies—with a continually growing demand from developing countries, a globally limited supply, and in developed nations, an over-reliance on potable grade water for various applications that simply do not require such a standard (such as cooling water makeup)—is unsustainable.

We envision that much more, in the way of changing our collective current water sourcing and utilization practices, will undoubtedly have to take place in the near term, rather than at some time on the distant horizon.

The Built Environment and the Rise of Green Organizations

In recent years, it has become self-evident to many of us that we need to protect and restore our changing environment (our biophysical environment). But in our everyday world, we also mean the built environment, which encompasses our buildings, neighborhoods, cities, parks, and systems that provide our individual and global surroundings, and the setting for all sustainable human activity. However, in recognition and response to the unsustainable climate and resources position we find ourselves in, we have seen the founding of various national and international “green” organizations and programs, promoting conservation, sustainability, energy efficiency, and best engineering practices through the development of building assessment rules, incentives, and design tools. Green organizations include:

- Building Research Establishment (BRE) in the U.K.
- Green Building Council (USGBC) in the U.S.
- Green Building Initiative (GBI) in the U.S.
- American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
- Federation of European Heating and Air Conditioning Association (REHVA)
- International Association of Plumbing and Mechanical Officials (IAPMO)
- Building Owners and Managers Association (BOMA) International
- Dutch Green Building Council (DGBC)
- Canadian Green Building Council (CaGBC)





- Green Building Council of Australia (GBCA)
- New Zealand Green Building Council (NZGBC)

A further example is the International Facility Management Association (IFMA), which is a leader in sustainability and goes beyond certifying premises with a preferred building rating system, offering a Sustainability Facility Professional (SFP) credential program. This program is designed to reduce our impact on the environment, by teaching facility professionals how to create, manage, and operate sustainable facilities.

Green and Sustainable Facilities Water Management

All green initiatives, guides, and management tools require some measure of water conservation and efficiency in rated buildings; so, for example, water conservation features may require consumption targets within buildings to be less than, perhaps, 30 to 35 gal/ft²/yr, or that cooling towers be equipped with high-efficiency drift eliminators to achieve drift reduction down to only 0.002 percent of the circulated water volume for counter-flow towers, and 0.005 percent for cross-flow towers. The New South Wales (NSW) Department of Planning recommends using water from rainwater tanks in the pool and spa (with appropriate pH modification and use of chlorine disinfectant), and supports the use of rainwater tanks for all non-potable uses. Studies have shown that average measured water savings exceed 40%.

The USGBC has developed their Leadership in Energy and Environmental Design program (LEED), and this LEED system is one of only a few green building-rating systems that specifically considers cooling water management in buildings.

LEED offers credits for conservation in areas such as cooling water management for building HVAC® systems. The intent of LEED water efficiency (WE) by cooling tower water management is to reduce potable water consumption through effective chemical management and/or the use of non-potable makeup water. Credits are applicable in both conservation areas.

Unfortunately in the U.S., currently less than 1% of all commercial buildings, institutions, and small industrial facilities use non-potable or reclaimed water for use as cooling water system makeup or for irrigation purposes. Thus, while we wholeheartedly agree with the intent of the LEED WE Guide, we would suggest that, with respect to cooling tower water management, it does not go far enough and that some of its emphasis is misplaced. We argue that:

1. Chemical management is a poor term. Management of cooling towers requires the development of a water management plan that addresses more than simply chemical treatment, bleed-off, biological control, etc. The section is, in our view, poorly written and incomplete, given that energy is always the most costly and potentially environmentally damaging resource. The primary intent of a water management plan for cooling towers should be to focus on devising ways to minimize energy costs by maximizing heat-transfer efficiency—via producing and maintaining scrupulously clean waterside heat-transfer surfaces. If this objective can be achieved while simultaneously saving water through the use of non-potable makeup and high COC, then maximum green credits should accrue.

2. We acknowledge the importance of LEED (and similar green building programs) in the area of water efficiency, but suggest the program needs to consider not just WE credits but also water system energy efficiency (WSEE) credits. Also, WE and WSEE credits should be available for all types of

building heat-transfer water systems, not simply cooling towers. We need a comprehensive approach to water and energy savings in building heat-transfer systems, in order to identify and coordinate total conservation opportunities and carbon footprint reduction.

Expanding on the theme of a coordinated approach to identifying energy savings from each and every type of building heat-transfer water system, in many cases, it will be appropriate to employ analytical techniques such as pinch technology to calculate feasible thermodynamic energy targets (or minimum energy consumption) and achieve them by optimizing heat recovery systems, energy supply methods, and facility operating conditions. In large buildings, minimum water utility consumption should be targeted, leading to process network design/retrofit and a resultant water cascade table identifying water recycle and reuse paths. Such an approach will inevitably mean tight control of pretreatment equipment and chemistries, effective bleed-off and biological control and, in many cases, the use of pumped feed systems and automatic monitoring and control equipment linked to in-house building energy management systems (BMS). Also required is the active involvement and commitment to the program of in-house or outsourced building staff—not simply training. Above all, if waterside operating problems are to be avoided in the water and energy resource management plan, a water treatment professional is required to interpret results and advise on and coordinate the overall program.

So what is the current direction of the world's water treatment industry? It's changing in response to the global water crisis, the on-going pollution-control problems we all face, and the demands from newly industrialising countries. Also, it is gradually sinking into our collective brains that wastewater is NOT waste—it's a resource to be tapped, to be recovered, cleaned up, and reused. Industry has known about this for years, and has generally found ways to recover and reuse water—like the tomato paste plant shown below in **photograph 1**.

Nevertheless, industry everywhere still has a lot more it can do, and we can probably take any large factory and find a half-dozen ways to further reduce, recover, and recycle water.

Globally, we now see many newer technologies available to recover and reuse water, especially the various types of membrane technologies. Water recovery and reuse systems based on membranes such as reverse osmosis (RO) are now less expensive than only a few years ago, and can be cost effective in many applications such as the preparation of boiler feedwater, or the side-stream filtration of cooling water. Where considerable quantities of poor quality industrial water require treatment (such as shale-gas produced and formation waters, refinery oily wastewaters, or steel industry continuous casting and slag cooling waters), it might be more efficient to move to falling-film evaporator pretreatment equipment designs. And where zero liquid discharge (ZLD) is required, these types of industrial facilities may opt for brine concentrators and crystallizers (as some utility power plants already employ).

Photograph 1: Tomato Paste Plant With Multi-Effect Evaporators for Water Recovery From Tomatoes and Reuse in Boiler and Cooling Utilities



Photograph 2 shows a small industrial RO membrane system that can often be useful for commercial facilities, in order to pre-treat many types of non-potable water grades for use in utilities. Microfiltration (MF) and ultra filtration (UF) are other types of membrane technology now increasingly specified. UF is fast becoming the new workhorse for a wide range of industrial water cleanup programs. It can also be very suitable for all types of commercial and institutional facilities.

Photograph 2: Newly Installed RO System to Treat Poor Quality Lumber Mill Well Water for Industrial Application in Their Utilities.

The subject of industrial water reuse as both a means of reducing operating costs and



taking a responsible environmental stance, is now commonly discussed in very many types of industries, as per the article from the May 2011 issue of Process Cooling. The magazine cover is shown in **photograph 3**. Additionally, referring back again to the generally more limited options for commercial and institutional buildings, rainwater harvesting is a further avenue for providing a water source to utilities that does not come out of the city water tap as shown in **photograph 4**.

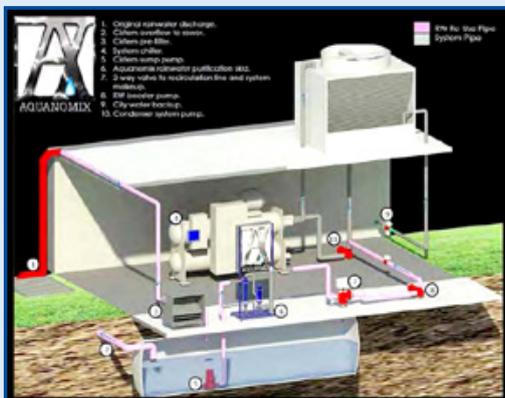
Photograph 3: Advice on Industrial Water Reuse, Published In Process Cooling Journal, May 2011

Photograph 4: An Aquanomix (NC) Rainwater Harvesting Scheme for Water Reuse



in Commercial and Institutional Facilities

The obstacles to reliably employing non-potable water grades and/or recovering and



recycling alternative water sources every day within the built environment often depend upon variations in the available water qualities, such as the types and concentrations of naturally occurring contaminants, the season, or other variables of quality.

Another obstacle is whether or not we can establish a suitable and economic "fit-for-purpose" pretreatment system design. Also, what control will be provided to the various specialist "polishing" maintenance of chemical inhibitors that will

ultimately be required? An expert water treatment chemical engineer will be needed to provide advice. In turn, the design basis for a reuse water project is driven by the pretreatment technology selected and the consistency of the water quality produced, plus any specific stress or other issues relating to the intended use of the treated water within the facility. Also, the options for good control of the water chemistry during the system or process operation need to be addressed:

- If we have poor quality water but excellent pretreatment and chemical control, we may be able to operate with a much smaller margin of safety against possible utility waterside problems;

- With average to good water and only poor pretreatment design and chemistry control, we will need a wider operating envelope, as it becomes difficult to optimise waterside efficiency.

As an example of what can be achieved in a water reuse project, consider the Cousins/Bank of America joint venture project to revitalize the historic Third Ward in the city of Charlotte, NC, which had deteriorated over the years as residents migrated to newer areas of the city.

On the 15-acre site development there is now 1.5 million square feet of high-tech office space, 125,000 square feet of retail and 1,000 residential units. The developers chose to use an Aquanomix ground water remediation scheme (based on cartridge filters, carbon filters, and UV sterilization, as shown in photographs 5 and 6) to recover and treat ground water, which is contaminated with a variety of volatile organic compounds (VOCs), rather than rely on city water. Currently, the developers now reclaim 3.5 million gallons per year of water for cooling tower makeup in Building 900 shown in photograph 7. The reclaim water system is financially viable and environmentally safe. It also has won LEED points for water efficiency and innovative design.

Photographs 5/6/7: The Ground Water Remediation Scheme for Gateway Village, a Bank of America/Cousins Joint Venture Development

Finally, in considering the economic and environmental case for sustainable water



management, it is important to understand that access to a good quality water supply and improved sanitation are two key factors in improving the health and economic productivity of all communities, wherever we may live in this world. Additional key factors include the development of new water sources, prevention of water resource degradation, and improvement in the efficiency of water consumption and utilisation.

Wastewater and rainwater reuse contributes to all of these elements. Wastewater and rainwater reuse can provide a useful alternative source of water and reduce the environmental pollution load by reducing discharges. Moreover, water reuse in agriculture, industry, and commerce enables more efficient water withdrawal for other purposes.

Therefore, the reuse of wastewater or rainwater for facilities management provides the potential to bring about environmental, economic and financial benefits to us all.

ACKNOWLEDGEMENTS

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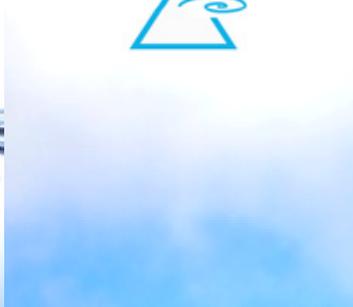


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Waterscan

NEWS FROM THE WHOLE FIELD OF WATER AND ITS EFFECTIVE MANAGEMENT

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Gritting turning female frogs into males

Naturally occurring chemicals used in de-icing substances eventually can enter ponds and alter the sex of young frogs. Researchers at Yale University found that gritting can reduce the number of female frogs by 10 per cent in a given area, as well as harming the quality of their eggs and size of their offspring. Each year more than two million tonnes of salt are spread on icy motorways and main roads in the UK. Most frog species breed in the spring or late winter if the weather is mild, just after the peak season for spreading salt. Scientists say that the practice could threaten the sustainability of frogs in the wild and may also be harming other aquatic species.

Ocean 'acidification'

As all our erudite leaders know, the rising level of carbon dioxide in the atmosphere is lowering the pH of the oceans. This so-called 'acidification' is, of course, merely a reduction in alkalinity (there is no risk of the sea actually becoming acidic). The threat to creatures most talked about is to those that make shells out of calcium carbonate. Numerous laboratory experiments support this view. There is also evidence that the shells of several widespread marine species are thinner and weaker now than they were a few decades ago.

Sustainable fishing fuel doubts

Sustainable fishing might use more fuel per fish than vessels that just catch all the fish in their vicinity. Consumers are guided by eco-labels that highlight factors such as leaving enough fish in the sea to maintain populations. However, they do not take into consideration carbon emissions. Brandi McKuin and her research team at the University of California, Merced, have analysed papers and catch databases. It was found that tuna vessels using more sustainable methods such as pole and line fishing consume about three to four times as much fuel to land the same catch as boats that use a large net. McKuin also makes the point that the energy needed to freeze fish on route to the shops might add to the impact.

Falsie alarm

Senior constable Zoe Brady, in November 2016, told a press conference in Maroochydore, Queensland, Australia; "A member of the public entered the police station with a suspicious object and asked to report a possible homicide. The concerned citizen had found what appeared to be a breast implant on the beach and feared that it was a prosthetic implant from someone who had drowned or had been murdered. The alarm was raised, officers were placed on high alert, while the gelatinous item was bagged and receipted and sent for analysis.



Several hours later, the laboratory reported that the suspected breast implant was, in fact, a jellyfish. At which point, officers were told to stand down". Colin Sparkes, from Surf Life Saving Queensland, said that: "The suspected breast implant was most probably a blubber jellyfish, which is commonly found in these waters. It seems that the unfortunate creature had had all its tentacles eaten by fish or knocked off by wave action. What was left closely resembled a breast implant, both in appearance and to the touch".

Cricket club "goes green"

The new Warner Stand at Lord's, planned to open in May this year, will be heated by a ground source heat pump that will extract energy from water pumped from 200 metres down in an aquifer. There are two boreholes at each end of the ground that will abstract and then return water to the aquifer. The stand also incorporates photovoltaic solar roof panels, solar thermal technology as well as a water collection and recycling system.

Scotland's seaweed boom coming

The rugged coast of Scotland could soon become the country's entry point to a very lucrative \$6.5 billion global industry. The demand for seaweed is booming for everything from food to biofuels, pharmaceuticals, toothpaste, fertiliser and industrial gels. Conditions in Scotland, especially along the west coast are perfect for mass cultivation. According to Fiona Houston, co-founder of Mara Seaweed, it means that the country has the potential to be much more than a minnow among the big fish from the Far East, which together grown more than 75 per cent of the total world production. Though a handful of companies already harvest algae the industry is poised for a sea-change, with growing talk of industrial-scale cultivation.

Bacterium thwarts jail break

The *leptospira* bacterium, usually contracted from exposure to rats' urine, thwarted the attempt by four prisoners to escape from a Barcelona jail. After several days of tunnelling they became ill with a febrile illness and muscular aches and pains, warranting admission to the prison hospital. When three of them developed jaundice and the fourth mild kidney failure, blood tests found that all were afflicted by Weil's disease caused by *leptospirosis*. The authorities initially suspected that the water supply must have become contaminated. However, with no further cases, the coincidence of them all sharing the same cell prompted its inspection. The tunnel was discovered, leading directly to a disused sewer full of stagnant water.

'Massacre' of dolphins in British seas

According to the Cornwall Wildlife Trust dolphins are being massacred in British waters, half as many having died in December 2016 and January 2017 as during the whole of 2016. A total of 106 dolphins and porpoises have washed up on Cornwall's beaches and in fishing boat nets in eight weeks. The toll for 2016 was 205 whilst in the previous two years the numbers had been less than 100. Large trawlers are being blamed for the increase, French boats are said to be the worst offenders because they work in pairs.



Demon shrimp invasion

An invasive species, *Dikerogammarus Haemobaphes*, known as 'demon shrimp', has wiped out native freshwater shrimp on stretches of a Staffordshire river. The alien creatures arrived in England five years ago, possibly in ballast water carried by ships.

Previously, it had only been detected in slow-moving reaches of rivers and canals, but was found to have colonised a fast-flowing section of the Churnet, a tributary of the Dove in Staffordshire. This suggests that it could spread more easily than had been thought.



Sea bass quota cut

An 80 per cent reduction in the catch limit for sea bass has been imposed for 2017. Fisheries ministers across the EU have agreed the change in response to the sharp decline in the breeding population, which has halved in northern European waters since 2010. About 800 British fishing boats that use large, hanging gill nets will be restricted to 250kg of bass a month in a "bycatch allowance" (where bass was not the target catch) down from 1,300kg in 2016. Recreational anglers will continue to be banned from keeping any bass for the first six months of the year and limited to one fish a day after that.

Chinese Trump brand toilets

The name has nothing to do with the 45th president of the U.S. Shenzhen Trump Industries was founded in 2002. Its Chinese name, Chuang Pu (*no sniggering at the back. Ed.*) means "innovate everywhere". It sounds similar to a nick-name often used by Chinese people for Donald Trump: Chuanpu.

The firm makes toilets for "high-end" spas, hotels, also public institutions, and uses the world's first "continuous rewinding toilet sanitary cover device". The company claims that Trump toilets are used 100 million times a year in China.

Many Chinese products use the word Trump. In 2006 Mr Trump applied in China for ownership of its trademark in construction services. In February this year, a Chinese court agreed to this. The legal implications for Trump toilets are not known.

Flooding in the outback

A record amount of rainfall in Australia closed its famous national park at Uluru, over Christmas 2016, in what meteorologists described as a "twice a century" event. Waterfalls appeared all over the huge sandstone landmark, which is also known as Ayers Rock.

Roads around the rock became inundated with water, after some 400mm of rain fell. Rangers had to close the park on Boxing Day as a result and some 25 houses in the nearby town of Kintore were flooded, with dozens of residents evacuated.

Kintore was almost completely cut off, as were the other local towns, Papunya and Yulara. No one was injured during the flooding, with damage restricted to housing, fences and a number of submerged cars.

NIMBY Newts

They are amphibious creatures, measuring 17cm, but for housebuilders they can be a big problem. Companies must pass strict planning regulations to build near a colony of great crested newts, which are protected under both British and European law. It is illegal to harm or disturb their habitat and can incur an unlimited fine and up to six months in prison. A developer has to apply for a licence before it can catch, possess or handle great crested newts.

The building developer Gallagher Estates in Milton Keynes spent more than

£1 million catching 150 great crested newts, which had to be relocated to specially created ponds, costing £6,700 per creature. The development of 6,500 new homes on the 900-acre site was delayed by a year.



You've got to be coddling

Scientists believe that Cornish cod heading north to find cooler waters may not be able to find a mate if their counterparts cannot understand their accents! Experts believe that cod, which make sounds with their swim bladders to attract mates, may have regional accents – so if the Cornish cod speaks a different dialect from say a cod from the north it could threaten its ability to breed.

There are also concerns that noise pollution from boats and other marine activities could be drowning out the "gossip" cod need to establish territories, raise the alarm and for mating.

Professor Steve Simpson, from the University of Exeter, who is leading the research, said cod produced thumps and growls across different frequencies. They have traditional spawning grounds, making populations quite isolated in reproduction. He said "Recordings of American cod are very different to those from their European cousins so there is a precedent. This species is highly vocal with traditional breeding grounds established over hundreds of thousands of years, so the potential for regionalisation is there."

Toilet Paper for Smartphones

In Tokyo airport toilets, a mini-roll of anti-bacterial screen cleaner is available for wiping users' mobile phones. This offers a healthy option for those who scroll whilst they contemplate.



Large lake threatened

Lake Skadar, shared by Albania and Montenegro, the largest in Southern Europe, is at risk from various threats. The development of an "eco-resort" on its shores and several hydropower projects on its major tributary could damage biodiversity and harm endemic species that are unique to the area.

The lake is an area of international importance for birds, but the Montenegrin government wants to build several dams on the river Morača, which provides most of its water, which would leave bird-nesting sites vulnerable.

Development of the eco-resort is due for completion in 2019. Critics of the scheme fear that tourism will drive birds away and pollute the lake with waste water. The company responsible for the resort insists that it has carried out impact studies and claims that some of the profits can be used to keep the area clean.



Snowstorms end California drought

Winter storms deposited snow several metres deep in California during the second week of January 2017, raising hopes that the state's worst drought in modern times was near an end.

Added to further intense storms through January and February the cumulative effect has been a significant restoration of reservoir and groundwater levels across the region.

Precipitation and snow pack this winter already exceed that of an entire average water year for most of California, with two further months of the wet season to go.



Image: www.businessinsider.com

Japan's hot spring toxic gas

Japan's famous hot springs, one of the country's greatest pleasures, healing the body and soothing the mind, are under scrutiny after revelations about a poisonous gas which could endanger bathers' lives. One man spent two years in a coma in a Tokyo hospital after inhaling a toxic gas whilst bathing in a hot spring, or onsen. A government survey found that 33 springs have dangerously high levels of hydrogen sulphide, furthermore, it also revealed that only one fifth of hot springs are tested for dangerous levels of gas.



Japan has 3,000 onsen hotels with 6,500 individual baths, supplied by geochemically heated groundwater. The mineral rich waters are believed to smooth the skin, soothe the rheumatic joints and invigorate the reproductive organs.

Salmon suffer from sea lice

During 2016 global supplies of salmon were severely affected by an infestation of sea lice. The parasites, *Lepeophtheirus salmonis*, which are less than 0.6 in. long, had caused wholesale prices to rise by as much as 50 per cent, by January 2017.

The outbreak came after stocks had already been depleted by deadly algal bloom in Chile, the world's largest producer of farmed salmon. By January 2017, farms in Scotland and Norway were affected by the lice.

The parasites, which spread by being blown across the surface of the water, feed on the blood of the fish, damaging their fins and skin and spreading other diseases. They can kill their hosts if they reach high enough numbers.



Image: www.robedwards.com

Acid rain attacked Palace of Westminster

The Palace of Westminster's refurbishment, which is expected to cost £3.9 billion, includes the repair of crumbling stonework caused by air pollution.

This is far from being a new problem. Even whilst being under construction, from 1840 to 1870, the stones were decaying as they were laid down. Ground breaking research was carried out by the chemist Robert Angus Smith. He realised that the clouds of coal smoke from the Industrial Revolution were turning the rain so acidic that it was damaging stonework as well as causing other problems. The damage to the stonework was worse than it might have been because of the use of poor quality limestone that had been chosen because it was cheap, could be supplied in blocks up to 4ft thick and was suitable for elaborate carving.

Little was done to prevent deterioration during the 19th century but in the 1920s a more durable stone was used to begin repair work but work was suspended during the Second World War and was not completed until 1960. By the 1970s the effects of air pollution were visible again and stone-cleaning and restoration was started in 1981. However, in recent years the Houses of Parliament have been badly corroded by ozone pollution from smog caused by traffic.

Seaweed's toxic gas hazard

In January 2017 a warning was issued after a bay on Jersey's south coast was taken over by bright green sea lettuce, *Ulva lactuca*.

A crust forms over sea lettuce; then the sun's rays heat the crust producing hydrogen sulphide. When the crust breaks, pockets of the gas are released. In September 2016, a jogger in Brittany on the opposite side of the Bay of Saint-Malo collapsed and subsequently died after inhaling the toxic gas. Also, a horse died and its rider rendered unconscious on a nearby beach covered in the same bright green sea lettuce.

Campaigners in Jersey claim that the thick green layer that has coated St. Aubin's Bay near St. Helier is the result of the discharge of 18 million gallons of partly treated sewage and waste water. The waste has high concentrations of nitrates and ammonia, creating a potent fertiliser on which the sea lettuce thrives. The island's response has been to use tractors to push the seaweed down to the low-tide line in the hope that it will be washed away. However, Dave Cabeldu of Save Our Shoreline Jersey, said "nothing gets washed away. It just gets washed back up the beach". He claims that the source is a sewage treatment plant in Bellozanne Valley.



Images: www.scientificamerican.com & www.theguardian.com

Squid 'n' chips

With warmer seas affecting cod and haddock populations in the EU's fishing grounds, Government scientists have predicted that our national dish will have to take on a Mediterranean flavour in future. Cod and haddock are moving further north to colder waters off Iceland and Norway, and this will increase the fishermen's time at sea, and therefore the cost of future supplies of these favourites.

"UK consumers enjoy eating quite a limited range of seafood, but in the long term we will need to adapt our diets," said Dr Pinnegar, of the Environment, Fisheries and Aquaculture Science dept. "In 2025 and beyond, we may need to replace cod and other old favourites with warm-water species such as squid, mackerel, sardine and red mullet."

Summer squid fisheries are expanding rapidly in areas such as the Moray Firth, as efforts to reduce over-fishing have prevented vessels from pursuing the more traditional species.

First floating city

The world's first floating city is to be built in French Polynesia to deal with rising sea levels. The joint venture, with a US company, The Seasteading Institute, San Francisco, is planning to begin construction of the sustainable island communities in 2019, using a design agreed with the country's government. The institute, founded in 2008 to establish cities on seaborne platforms, believes they will be part of the solution to sea-level threats to low-lying Pacific nations.

Image: www.seasteading.org





Submersible drone for anglers

Anglers have adopted a number of high-tech aids in recent years and now a fishing drone has arrived.

The device, called PowerRay, has been developed by PowerVision, a drone maker in Beijing. This is a submersible that carries a video camera to send images back to the angler on a bank or boat. These pictures can be viewed on the screen of the hand-held unit that controls the drone or on a smartphone.

PowerRay has a fish detector which uses sonar that is claimed to distinguish between species, so that the angler can identify the wanted target. The drone can then be used to carry a baited hook to the location and also can emit an alluring hue of blue light which is supposed to attract fish.



Image: www.mashable.com

Great lakes not so great

According to US Pulitzer Prize finalist Dan Egan, the Great Lakes are undergoing "an ecological catastrophe unlike any this continent has seen". The lakes' fauna have been dramatically altered by humans since invasive species first sneaked up through the man-made Saint Lawrence Seaway.

Damaging mistakes sometimes arose from well-intentioned policies. Researchers imported Asian carp to kill river nuisances without using chemicals. However, some people worry that the fish has invaded Lake Michigan's floor via the Chicago Sanitary and Ship Canal.

Also, the lakes' imported problems are rapidly becoming national disasters, for example, the tiny and quick-spawning quagga mussel has infested regions as far away as Lake Mead and Lake Powell on the Colorado River.

UK's Antarctic HQ to be evacuated

88 scientists at the British Antarctic Survey, including 16 that were scheduled to remain during the polar winter, are to be evacuated from their research station for the first time after a worrying crack developed in the ice sheet.

The renowned eight module Halley VI ice base, from which the hole in the ozone layer was first detected, was recently relocated 14 miles across the Brunt Ice Shelf because of an encroaching fissure in the ice. Now, however, a new crack has been steadily growing to the north of the base and could cause a large iceberg to break away, which could destabilise the area.

Although the BAS says nobody is in immediate danger, it cannot be sure that conditions will not worsen during the coming southern polar winter when an evacuation would be impossible.

"We want to do the right thing for our people," said Captain Tim Stockings, the director of operations. "Bringing them home for winter is a prudent precaution given the changes that our glaciologists have seen in the ice shelf in recent months."

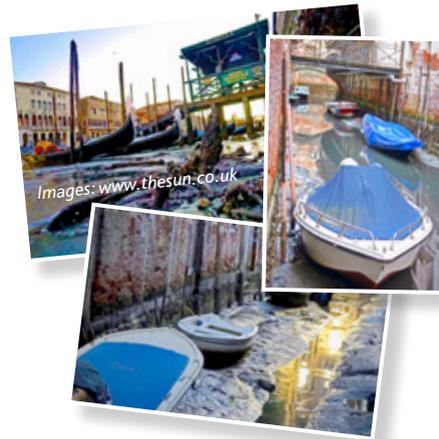
Image: www.telegraph.co.uk



Gondolas stranded

For many years climatologists have warned that Venice is in danger of flooding because of rising sea levels.

Surprisingly, in December 2016, the water level in some of the canals of Venice fell so low that gondolas were stranded.



Images: www.thesun.co.uk

Most remote public lavatory

The most remote public lavatory on mainland Britain is to be built, more than 300 feet above sea level and only accessible by an 11-mile hike. The facility at Cape Wrath in the far north-west of Scotland is being constructed by the peninsula's only resident.

John Ure, who runs the most remote cafe in the country, said: "I think the main thing that has been missing up here is a public toilet, so I am planning to install one in an outbuilding and have it open around May. I hope to have full bunkhouse facilities open at the same time."

The café is an 11-mile hike from the village of Kinlochbervie and receives several thousand visitors each year.



Images: www.capewrathtrailguide.org

5p charge reduces plastic bags on beaches

The number of plastic bags littering beaches had almost halved in 2016 since the 5p charge was introduced. The Marine Conservation Society said that the charge had been instrumental in 'helping' to clean up the coastline.

In 2015 the charity's army of volunteers found an average of 11 plastic bags per 100 metres of coastline, but in 2016 there were fewer than 7, the lowest amount recorded in the past ten years. Overall, the amount of litter found on British beaches has fallen by 4 per cent in 2016 and the 6,000 volunteers have collected 268,384 items. However, the quantity of drinks containers found, including plastic bottles, bottle tops and aluminium cans was up 4 per cent.

Water meter phobia

Residents of Hampstead, London, are extremely worried about the planned installation of internet-linked water meters in their homes.

Their angst is not at the prospect of per-litre water tariffs but a leaflet hand-delivered in South Hill Park that claims the electromagnetic emissions from smart meters can strip lead from pipes and poison the water. The document also states that the meters are "making us all electro-sensitive" and "cause trees, plants and bees to die, allegedly". The leaflet also informs the residents that further information can be found "on YouTube".

Fish eaters consume microplastics

Researchers from the University of Ghent in Belgium, believe that microplastics within seafood accumulate in the body and could become a long-term health risk. They estimated that the average person is currently ingesting - every year - 11,000 pieces of microplastics. In their study, the first comprehensive risk assessment of its kind, they calculated that more than 99 per cent of microplastics passed through the body, but the rest is taken up by body tissue.

Furthermore, they say that the threat will grow as marine pollution increases. There are an estimated five trillion pieces of microplastics in the world's oceans and seas. By the end of this century, at current trends, the average fish eater will be consuming 780,000 pieces of microplastic each year. One rubbish truck (equivalent) of plastic is added to the seas every minute. By 2050 this volume will have quadrupled.



Review of old platforms' disposal

Ministers have been asked to consider allowing oil companies to leave old production platforms in the North Sea to save taxpayers billions of pounds and avoid environmental damage.

On 23rd January this year, Sir Edward Davey, a former energy minister, and Jonathon Porritt, the environmentalist, called for a review of rules that require most infrastructure from more than 470 platforms to be removed at a cost of about £50 billion. Almost half of that cost is expected to fall to taxpayers through tax relief offered to oil companies.

Sir Edward and Mr Porritt said that science had moved on and that the "clean seabed" principle "might actually harm the marine environment". They suggested that many sub-sea structures could be left or collapsed on the seabed to create artificial reefs, with some of the money saved to be spent on other environmental projects.

A government spokesman said "In the vast majority of cases, installations must be fully removed". Lang Banks, director of WWF Scotland said: "The OSPAR agreements were hard-won environmental gains that should not be unwound. If we give the oil and gas industry an inch, they will take a mile."

Rules obliging energy companies to leave no trace of their operations were enshrined across Europe in the OSPAR Convention after the outcry over Shell's plans to dump the Brent Spar storage buoy in the sea in 1995.



Image: www.jsel.org

Climate change forces relocation of Alaskan village

The 600-person village of Shishmaref, located on an island just north of the Bering Strait, has for decades been ravaged by flooding and erosion tied to climate change, leading residents to seek a more sustainable place to live. But the community is racked by poverty, making it difficult to relocate, which is estimated to cost \$180m.

Officials held a special election in August 2016 so that residents could vote on whether to relocate or to stay and add environmental defences. The vote was relatively close, with 89 for relocating and 78 to remain. Both choices came with a steep price tag. The most recent estimate on relocating, from a 2004 Army Corps of Engineers study, was \$180m. Officials said it would cost \$110m for the environmental protections needed for the community to safely stay in one of Alaska's most eroded coastal areas.

In February 2015, Sally Jewell, the secretary of the interior, announced \$8m in funding for "projects that promote tribal climate change adaption" in Alaska, but that is far short of the money needed in Shishmaref and the other 30 most vulnerable villages that face "imminent threats".

By 2050, some 50 to 200 million people are expected to be displaced by climate change, according to the United Nations University Institute for Environment and Human Security and the International Organization for Migration.



Images: www.theguardian.com

Modern lavatories battle elderly

According to an Age UK report, modern lavatory flushes are putting the elderly off shopping. The charity is urging retailers to improve the facilities after more than half of over 75s responding to a survey said that too few lavatories was a "regular" problem. Some elderly shoppers reported difficulties with modern push-button style flushes, which they said were trickier than traditional handles for those with arthritis or dexterity problems.

Our older readers will remember how the high cisterns, operated by pulling a chain, were much more effective at flushing than modern designs. Ed.

Arctic ice loss

The full extent of ice loss in the Arctic is not seen by satellites, the ice caps shrinkage is usually expressed in terms of area but the change in volume is just as striking. Between 1980 and 2016 the amount of summer ice in cubic kilometres has decreased by an estimated 72 per cent.

Julienne Stroeve, a researcher at the U.S. National Snow and Ice Data Center, says that the Arctic may be free of ice by mid-century if we continue emitting greenhouse gases at the current rate.

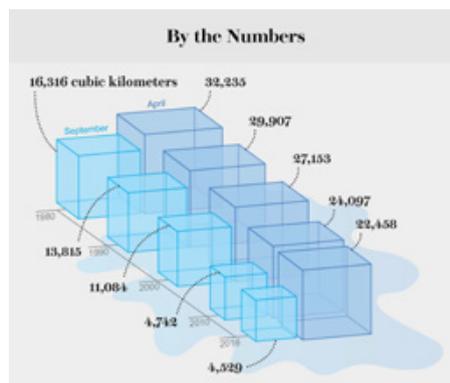


Image: www.scientificamerican.com

Grants for 'useless' flood defences

Millions of pounds of taxpayers' money has been wasted on fitting thousands of properties with poor quality flood defences that will fail when Britain is next struck by storms, according to experts.

A number of companies have been accused of installing substandard products under a government grant scheme. More than 16,000 properties flooded during December 2015, with those affected entitled to claim up to £5,000 for installing measures such as anti-flood airbricks and doors. Official figures show that so far £14 million has been paid out to 4,100 households. There are concerns that local councils, who administer grants, are not carrying out enough inspections of household defences and are paying out to companies that use unqualified installers.

One company that is subject to complaints is Adler & Allen, a member of a body set by the Prince of Wales to help communities blighted by natural disasters. Sara Marriott, managing director of the Flood Advisory Service, said that the company was "not certified to survey and install property-level protection measures" to Kitemark standards, and has complained to Prince Charles directly.

Groucho Marx described politics as the art of looking for trouble, finding it everywhere, diagnosing it incorrectly and applying the wrong remedies. Ed.

Microbead ban must go further

Environmental groups say that a loophole in a proposed ban on plastic microbeads in cosmetics will allow manufacturers to continue polluting the oceans by using them in make-up and sun cream.

The government plans to ban "rinse-off" products containing minute plastic particles such as shower gel and toothpaste. However, a survey commissioned by a group of environmental organisations has found that people rinse off make-up and sun cream, meaning that any microbeads in those products could end up in the sea.

The YouGov poll of 2,141 adults found that 42 per cent of those who use make-up rinse it off. Also 60 per cent of adults who do not wear make-up but use products such as sun cream rinse them off.



Less Hg in bluefin tuna

Nicholas Fisher, a marine biogeochemist at Stony Brook University is co-author of a recent study that found mercury levels in Atlantic Bluefin tuna decreased by 19 per cent between 2004 and 2012. Fisher and his colleagues directly linked the decline to reduced mercury emissions in North America, most of which is attributed to a reduction in the use of coal by the industrial sector.

He says: "This tells me we don't just have to wring our hands about the high level of mercury in these fish. There is something we can do about it and get pretty quick results".





Holy water decontamination problem

In *The Journal of Hospital Infection*, about 20 years ago there were several papers that reported bacteriological contamination of holy water from various sources, including Lourdes. In some cases, when the water was sprinkled onto patients by relatives, the contaminating micro-organisms caused infections.

A question was raised as to whether sterilising the water by heat treatment (autoclaving) would remove its holiness or miraculous properties. A hospital padre was asked for his opinion on the matter. His decision was that those properties would be retained, despite the high temperatures involved.

A moment of levity in Parliament

On Tuesday 17th January this year, the rather boring session of local government questions was enlivened by a comedic moment. Mr Sajid Javid announced that the new Local Government Finance Bill would be offering "discretionary relief" in the area of public toilets, causing some amusement in the house.

Spend a penny in public – get a nasty surprise

Council workers in Chester have turned civic super-heros by using wee-repellant paint to give revellers a soaking if they decide to relieve themselves in the street over the Christmas period and beyond. The Pee-Back campaign is based on the use of liquid-repelling paint that has been applied to many locations across the city. Anyone who urinates against these walls will find their pee bounces back and soaks their footwear and clothing.

The council turned to the extreme wee-busting measure after getting peeved with anti-social revellers who are damaging historic structures by their actions, and causing distress for residents and businesses. A light hearted campaign informing people of the new initiative is being launched to create awareness. This includes an online video, showing what happens to transgressors, and which is being promoted extensively via social media, and through a QR code on beer mats and posters.

The campaign was launched week beginning 5th December but will continue throughout 2017, with heightened promotion at key times such as the Chester races.

The elvermen of the River Parrett

The elvermen of the River Parrett, Bridgewater, Somerset, standing welly deep in its muddy banks, are said to use language riper than a pregnant two-foot long European eel.

The elvermen, who know their craft, and their river intimately are only allowed to fish for the small baby eels, that arrive in their millions from the Atlantic and are washed up with the spring tides each year, using traditional nets attached to long poles.

This is a deliberately imperfect method that allows the elvers a chance to continue upstream. Despite the numbers that arrive, the European eel is still critically endangered and in Britain fishing is tightly regulated.



Threatened John West tuna ban

In January this year, the Co-Op issued an ultimatum to John West Foods to improve its tuna catching methods. The supermarket told the company that it has until the end of 2017 to abide by stricter rules or its products will be withdrawn.

All tuna sold in the Co-Op will have to come from suppliers that are independently monitored to ensure that they manage fish stocks sustainably and do not harm the marine environment.

This brings the Co-Op into line with Waitrose and Sainsbury's, which had already threatened to drop John West if it refuses to catch fish more sustainably. Tesco had already removed some of the company's tinned products from its shelves after it found that it had broken its promise to save dolphins, sharks and turtles from its nets.



Toxic plastic pellets taint British beaches

Britain's beaches are littered with millions of lentil-sized plastic pellets called nurdles (also known by the deceptive name of "mermaids' tears"). These are the raw material used by industry to make new plastic products.

In February this year, a search of 279 beaches across the UK found that 205 had nurdles on them. The largest number recorded in the Great Winter Nurdle Hunt weekend were found at Widemouth Bay, Cornwall, where 33 volunteers collected 127,500 pellets on a 100 metre stretch of beach. More than 1,000 were found in only 15 minutes at both Llwynon in Cardigan Bay and St Lawrence on the Isle of Wight. Nurdles spill into watercourses or directly into the sea after mishandling by manufacturers or accidents involving cargo ships which transport them in bulk around the world.



Fire safety sprinklers and LD

Social housing landlord Selwood intends to remove fire safety sprinklers from more than 200 homes on an estate in Wiltshire. The company claims that they are expensive to maintain, with costs of £50,000 per annum.

The sprinkler system, initially costing around £300,000, was installed in 1999 to protect new homes on Trowbridge's Studley Green estate. The sprinklers have been triggered at least three times since then and are thought to have saved two lives. Fire Brigades Union South West executive council member Tam MacFarlane said that local fire fighters were appalled. Selwood claims that the system poses a low level risk from legionella bacteria; an argument described by MacFarlane as "absolutely pathetic".

Many housing associations do use sprinklers in both houses and flats. In Wales, installation of sprinklers is now compulsory.

The economics of water conservation

As people get richer, they use more water. They also "consume" more of it in such a way that it is not quickly returned to the source from which it was extracted. The main cause of this is the world's increased demand for grain, meat, manufactured goods and electricity. Crops, power stations and factories all need plenty of water.

The situation is worsened by the fact that few places price water properly. Often it is artificially cheap because politicians are reluctant to charge much for something essential that falls from the sky. This means that consumers have little incentive to conserve it and investors have little incentive to build pipes and other infrastructure to transport it to where it is needed most. In South Africa, for example, households get some water free. In Sri Lanka they pay initially a nominal 4 cents for a cubic metre. By contrast in Australia, which takes water conservation seriously, an initial batch costs \$1.75 per cubic metre. (Where I live in rural Cheshire a cubic metre of water is around \$2.12 for supply and a similar sum for sewage discharge.....and it never stops raining. Ed.) Globally, spending on water infrastructure faces a huge funding shortfall. A gap of \$26 trillion will open up between 2010 and 2013, according to an estimate by the World Economic Forum, a think tank.

Adam Smith, the father of free-market economics, in the 18th century, observed: "nothing is more useful than water but scarcely anything can be had in exchange for it". Where water is in ample supply this is still true. However, around the world billions of people are already struggling during dry seasons.



APPLIANCE COMPLIANCE

Steve Tuckwell, WRAS, Technical Advisor



Introduction

Commercial premises often need higher levels of backflow protection for their water-using appliances, such as dishwashers and washing machines. This article provides advice to help identify the right backflow prevention for these appliances.

The design, manufacture and installation of appliances if supplied from the public water mains, come under the scope of the Water Supply (Water Fittings) Regulations in England, Wales and Northern Ireland and under the Water Supply (Water Fittings) Byelaws in Scotland, together referred to as 'the regulations'.

These appliances must be:

- designed and manufactured to be of an appropriate quality and standard;
- suitable for the circumstances where they are used; and
- installed so that they comply with the regulations.

In addition to the installer, owner and user's legal duty to comply with the regulations, the licensing of care homes includes a requirement that all relevant legislation must be complied with, which includes the water regulations.

Backflow Protection

Appliances must have suitable devices to prevent backflow. Backflow risk from the contents of an appliance is assessed using a system of fluid categories – where fluid category 1 represents drinking quality water and fluid category 5 is the most contaminated. In private domestic dwellings, dishwashers and washing machines are rated as fluid category 3. But in commercial premises there is a higher risk from the same appliances and the backflow risk is rated as fluid category 4, or if healthcare is provided in the premises, as fluid category 5.

The regulations require use of a recognised backflow prevention device. Backflow prevention devices are rated by the level of protection for different fluid categories. The device used must give protection at least as stringent as the assessed risk. For example, an appliance with a fluid category 4 backflow risk must have a backflow prevention device or arrangement of fittings which is rated at least fluid category 4.

Some appliances designed for the commercial sector have fluid category 5 backflow protection built in to protect the water inlets and can be installed without additional requirements. 'White goods' intended for the domestic market often do not state what fluid category protection, if any, is inbuilt although some may include fluid category 3 protection.

Where any appliance is used care needs to be taken to identify the backflow protection requirements and ensure that the appliance has the appropriate protection incorporated within the machine or has appropriate backflow protection installed upstream of the appliance.

Different backflow devices have different protection ratings. For fluid category 4 protection, appliances can be fed via a 'break tank' – a small storage cistern open to atmosphere and containing a Type AF airgap between the inlet and maximum water level. Alternatively a 'reduced pressure zone valve' (RPZ valve – a type BA device) can be used to maintain water pressure from the feed pipe. To provide fluid category 5 protection, only a break tank with a Type AA, AB or AD airgap is adequate.

Risk of Backflow:

Backflow is defined as 'flow within or from a water fitting in a direction opposite to the intended normal direction of flow'. Reversing the flow can draw contaminated water from an appliance into the water supply which may feed other outlets, putting drinking water and health at risk.

Appliance design and manufacture

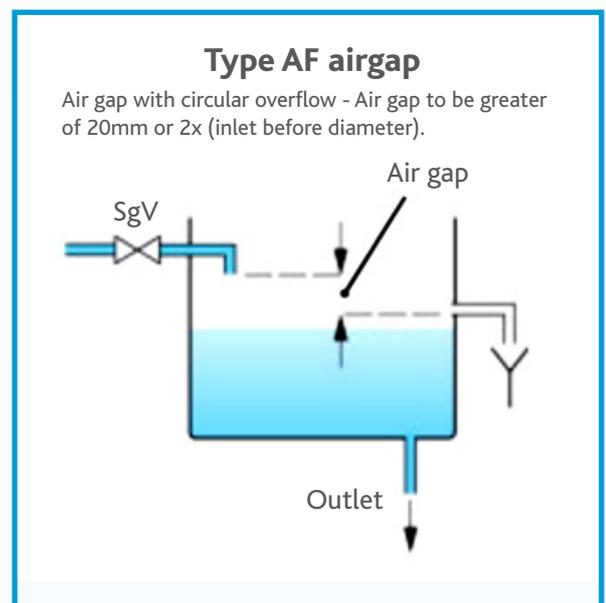
The installer has the legal duty to ensure that appliances comply with all aspects of the regulations. When inspecting the plumbing systems in new and existing premises, water suppliers' regulations enforcement staff may ask for evidence of compliance of fittings. People who specify, purchase or install appliances should ask the supplier or manufacturer to provide evidence to confirm that the appliance has been tested and complies with the UK regulations. One approval readily accepted by water suppliers is operated by the Water Regulations Advisory Scheme (WRAS) – however other methods to demonstrate compliance are available. Manufacturers submit their products for testing and WRAS assesses the results against the performance criteria and awards 'WRAS Approved Product'. Up-to-date lists of Approved Products are freely available on the WRAS website (www.wras.co.uk/directory). Usually WRAS Approval is accompanied by requirements for how the appliance should be installed - for example, with an external servicing valve or a given type of backflow prevention device. These 'Installation Requirements and Notes' (IRNs) must be complied with for the WRAS Approval to be valid.

Summary

When considering installation of appliances, a risk assessment should be carried out to assess the backflow risk from them and determine the degree of backflow protection required. Before specifying or purchasing appliances, evidence should be gained to show whether the required backflow protection is in-built, and if not, the installer must provide it externally to the appliance.

WRAS Approval is one good way to gain evidence of compliance of the design and manufacture.

And a final thought – in addition to a legal duty for the installer and the user to comply with the regulations, the licensing of care homes includes a requirement that all relevant legislation must be complied with, which includes the water fittings regulations.



Aqua free – your specialist for water hygiene

Aqua free provides immediate solutions to water hygiene challenges.

Their products require little or no modifications to pipework or other service connections and can be installed in minutes, providing users with an immediate barrier against waterborne bacteria such as *legionella* and *pseudomonas aeruginosa*.

UK Sales Director, Mike Hemingway commented: "Aqua free's philosophy is to work closely with our customers and we are always open to develop new solutions to meet their needs".

This innovative approach has allowed Aqua free to provide customers with holistic solutions which addresses a wide range of water hygiene challenges around the point-of-use, including: water stagnation and flushing; washbasin waste system infection prevention; and integrated filter options to provide a barrier to contaminants such as heavy metals and pesticides as well as bacteria.

Aqua free GmbH was founded in 1999 and since then has become established as one of the leading manufacturers of high quality membrane filters in Europe.

The Aqua free Group has headquarters in Hamburg, Germany, and, as well as in the UK, has sales offices in all major counties across Europe.

Mike is keen to stress the importance of local customer support: "Over the years the Aqua free reputation has been built on being able to provide a fast response when our customers need it. Indeed if you find your water supply to be contaminated you can't wait around for a week or even a few days to put a solution in place".

"That's the reason we've put together this range of immediately available **Legionella Solutions** to allow Water Treatment companies and Water Hygiene specialists to select the solution that's right for them".

The Aqua free **Legionella Solutions** range includes:

- Specialist healthcare products able to provide immediate relief from infection in the most sensitive hospital departments
- Point-of-use and in-line Legionella Control solutions for hotels, factories, public buildings or private homes
- 10" Cartridge solutions suitable for a wide variety of applications including Private Water Supplies and Rainwater Harvesting Systems and includes the unique Dual Stage filter range

For more details of how Aqua free can support your business, email info@aquafree.co.uk or call 01484 483 045.

Your specialist for water hygiene



Aqua free Solutions Ltd.
T: 01484 483045
E: info@aquafree.co.uk
W: www.aquafree.com



What is the point of a visit report?

Visit reports are typically the most commonly used process for communication on a routine basis between service providers and their customers. However, they are not often used correctly to communicate information, and more often they are typically just a data record. Sometimes they are signed by customers with little knowledge of what the results mean or what they are signing or accepting.

Many reports have control limits on the reports for the tests being undertaken, these may be temperature tests, chemical reserve tests, which are precise, they may be more subjective for example, a level of fouling, dirt in a cold water storage cistern (tank), or fouling of a cooling tower pack. They could also be used just to record that a critical conversation has taken place.

Detail Explanation Needed

If the person completing the report records a value outside the control limits there should be an explanation within the body of the report of why this may have occurred and advice on remedial actions needed to bring the system back into control, such that the control limits are met.

If this advice isn't present and the end user accepts the report (typically by a signature), they are demonstrating potentially a lack of competence in their own role in understanding the reports and the significance of the data. In this instance, there would be a potential lack of control of the system by both the service provider and their customer.

If you are a service provider and testing indicates results outside the control limits, you should advise in the report the consequence of this, the likely cause for it occurring and detail remedial actions required to bring the system back into control, who should undertake this and in what timescale.

If you are an end user who is in charge of running the system and you view a service report with test results outside of the control parameters you should demand that the report details why this may have occurred, the potential consequences of continuing to operate the system in the conditions reported and what remedial actions are needed, by whom and in what timescale.

Empty Boxes-Missing Data

Many reports have been designed to collect a lot of important data, in addition to the test results they may also show, chemical stock levels (in both dosing tanks and actual numbers of drums), water meter readings, dosing and control equipment settings, e.g. dosing pump settings, redox readings etc.

In practice, many of the records for this data are not recorded by the service provider representative, this may be for a variety of reasons. If there is a data entry field on a visit report it is there for a reason, it should be completed as it typically provides additional supporting information as to the operation and control (or lack of) of the system.

Conflicting Data

Reports may contain conflicting and at times possibly meaningless control limits. A number of reports for open evaporative cooling systems contain both a conductivity upper limit for the cooling water and a maximum concentration factor.

Viewing these on many occasions shows the conductivity limit has been exceeded (possibly due to a change in the input water conductivity), yet the system is still within the required concentration factor maximum. As such the report shows a 'failure' the exceeded conductivity limits but with no remedial actions stated as the concentration factor hasn't been exceeded. When setting control limits on visit reports consider what are the actual key control limits to be used, as if a control limit is set, but is not adhered to, why other control limits should be adhered to, this may confuse the end user.

Records

Service reports are records of system conditions, advice given and therefore have some legal status, they are the primary communication tools between service providers and system owners/operators and should be seen as a key tool for the continued safe operation of any system, be it a domestic water, evaporative cooling water, steam boilers closed systems and any of the myriad of process systems in place. As such it is vital they are completed correctly.



Member technical
question emailed in

To: admin@wmsoc.org.uk



Subject: ISO 14046:2014 - Water Management Strategy

Hi,

I was seeking some assistance to find out more information regarding "ISO 14046 Environmental management - Water Footprint - Principles, Requirement and Guidelines". I had found the WMS details in the BSRIA Blue Book for Key Industry Contacts and was hoping to speak with someone in more detail about this industry standard document and its application for developing a water management strategy.

Any assistance/input would be much appreciated.

All the best,
Jacob Enemark BSc(Hons)
Energy Analyst – Civil Government
Interserve Support Services



RESPONDED TO BY CRAIG ANDREWS, WATERSCAN

Firstly, we're pleased to hear you're interested in developing a water management strategy and doing your bit to protect a precious natural resource. In terms of how this is achieved, below is an overview of a standard framework and the common principles for developing a water strategy. This framework has been utilised with many organisations, both large and small, to great success. Many companies will build their own specific strategy and approach tailored to the unique requirements of their own organisation based on this framework, this way the measurement of performance is guaranteed to be relevant to them. As you'll see in the stages below, the first stage is to conduct an operational water footprint, which looks internally at your organisation water use. The ISO 14046 standard has a more environmental approach and looks at life cycle assessment of products, processes and the organisation and their impact on water quality – so would have only a minor role in the grand scheme of developing a water strategy.

Water Strategy Framework

- 1. Establish current operational water footprint**
Determine the baseline data for the strategy through meter readings, paper invoices, e-billing and AMR data. To get a comprehensive picture, a twelve month period of data should be allowed for.
- 2. Assess risks and opportunities**
Review the key water related risks – operational, financial, regulatory and reputational – plus industry and supplier issues and opportunities.
- 3. Set provisional goal and scope of project**
Decide on the goal and scope, based on findings and results from the earlier stages of the journey, to set challenging yet realistic targets.
- 4. Examine specific business and operational scenarios**
Define and measure what works within the business through evaluation of the latest technologies, achieved consumption reduction and user feedback to confirm the goal and targets are attainable.
- 5. Devise the strategy**
Applying the success and findings from the evaluation of operational scenarios against the original project scope allows the final strategy to be devised. This details project specific requirements to ensure targeted implementation of water saving solutions to maximise return on investment.
- 6. Implement, monitor, review and improve**
Roll out of the strategy and ongoing measurement of performance against goals. This provides clarity on the success of the strategy at regular intervals by reviewing consumption, cost and carbon targets to ensure performance is on track or to enable swift rectification if not.

Other environmental focused standards such as the European Water Stewardship program offer another approach. Water Stewardship goes beyond water footprinting and the ISO standard; and assess the use of water that is socially equitable, environmentally sustainable and economically beneficial; achieved through collaborative site and catchment based actions. Certification provides independent approval of water management and operational performance for Water Stewardship. Unlike others, this standard aims to change behaviour and practices based on continuous improvement metrics.

In terms of what is the best approach for your organisation, this will depend greatly on what you are trying to achieve and the goals that will be set. Developing a water strategy takes a look at a much bigger picture and has goals specifically tailored for the organisation, whereas the ISO standard has specific environmental goals in mind and would, if utilised, only form a small part of a full water strategy.

Continuing Professional Development (CPD) programme

Training for career progression series



Following the introduction of the CPD programme in the last issue of *waterline* we begin the series of CPD Training for Career Progression Sheets. Each Training for Career Progression Sheet outlines the necessary steps required to progress, in simple flowchart form.

Training for Career Progression - Sheet 1

Legionella Risk Assessment of Water Systems in Domestic Properties for Landlords and Letting Agents

▶ Training for Career Progression - Sheet 2

Open Recirculating Cooling Systems: Risk Assessment

Training for Career Progression - Sheet 3

Open Recirculating Cooling Systems: Treatment & Control

Training for Career Progression - Sheet 4

Cleaning and Disinfection of Water Systems

Training for Career Progression - Sheet 5

Legionella Risk Assessment for Landlords and Letting Agents who wish to provide legionella risk assessment services to companies and individuals

Training for Career Progression - Sheet 6

Legionella Risk Assessment of Systems in Commercial Premises

Training for Career Progression - Sheet 7

Temperature Monitoring, Sampling and Inspection of Water Systems

Training for Career Progression - Sheet 8

Steam Boiler Systems: Treatment & Control

Training for Career Progression - Sheet 9

Management and Control of Closed Systems

Training for Career Progression, Sheet 2



TRAINING FOR CAREER PROGRESSION

SHEET 2

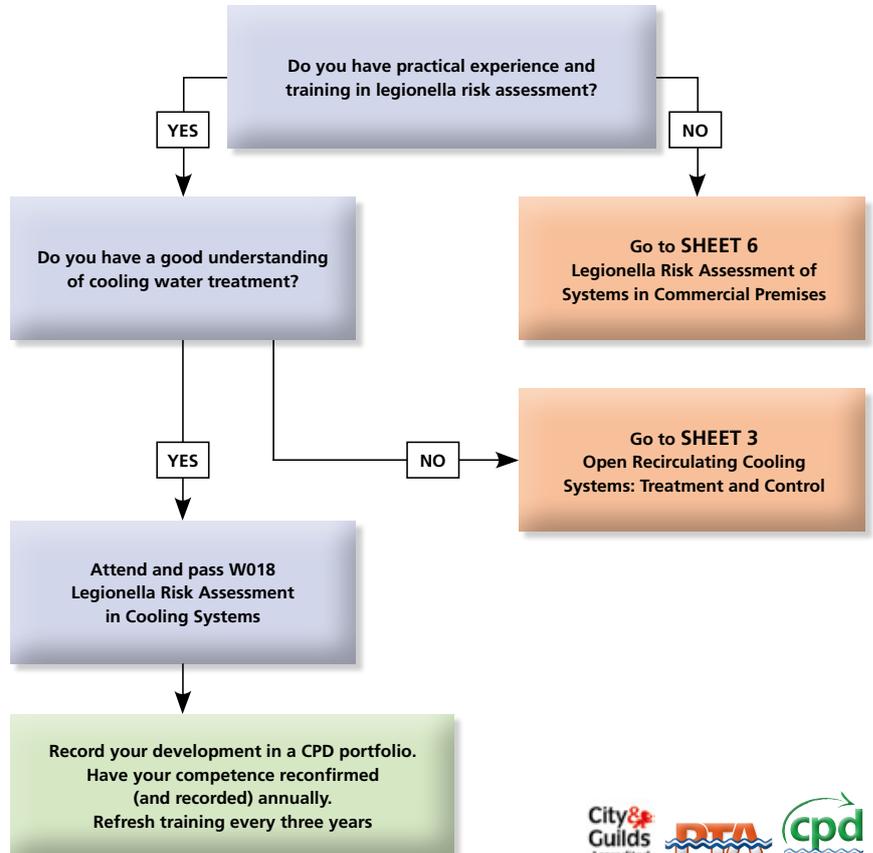
Open Recirculating Cooling Systems: Risk Assessment

TRAINING COURSES:

W015 Basic Legionella Risk Assessment of Water Systems

W024 Practical Legionella Risk Assessment

Delegates should have knowledge and understanding of legionella and risk assessment, either by attending the above courses or equivalent. It is also advised that they have complete understanding of cooling water treatment and control of cooling systems.



v.1-08/16

All of these Training for Career Progression sheets can be found on our website, along with more information on CPD at: www.wmsoc.org.uk/continuing-professional-development/

THE LATEST BSI: WHERE IS YOUR WATER
GOING? - PART 2

- Q1: What are the 3 main regulations for water fittings and what are the 3 options for products to demonstrate compliance?
- Q2: What is the scope of PD 855468 and what does the guidance apply to?
- Q3: What concerns does BS 8554 outline and does it apply to Legionella?

1 cpd
point

1 The 3 regulations:

There are three main regulations for water fittings: The Water Supply (Water Fittings) Regulations 1999 (England & Wales), the Water Supply (Water Fittings) (Scotland) Byelaws 2014 (Scotland) and the Water Supply (Water Fittings) Regulations 2009 (Northern Ireland). While not identical, these have similar provisions, and all contain requirements for "appropriate quality and standard" often referred to as Regulation.

The Three options for products to demonstrate compliance are:

1. Bear an appropriate CE mark to a harmonised standard;
2. Conform to an appropriate British Standard (or an equivalent);
3. Conform to a specification approved by the Regulator (i.e. Defra). Products must also be suitable for the circumstances; be appropriately installed in a "workman like manner", in accordance with Schedule 2 of the Regulations/Byelaws.

2 Scope of PD 855468:

- A. Residues of construction are adequately flushed from water distribution systems
- B. Appropriate water quality is achieved
- C. Appropriate disinfectants and processes are used
- D. Construction debris and dust are removed
- E. Risk of corrosion and damage to fixture, fittings and sensitive plant is minimised
- F. Adequate records of cleaning are produced
- G. Stagnation is avoided or managed
- H. Appropriate tools and personnel are deployed for the relevant tasks

The Guidance applies to:

1. Initial commissioning of new or extended systems
2. Maintenance of existing systems
3. Alterations of existing systems
4. Water quality management prior to occupation or as a result of low/no occupancy or usage
5. (Remedial) response to microbiological problems if identified

3 BS 8554 Code of Practice is for sampling and monitoring hot and cold water systems in buildings.

The new standard outlines three main concerns: samples should be representative and repeatable; the sampling process itself shouldn't contaminate the system; and the composition of the sample should not change between collection and analysis.

BS 8554 has been designed to help ensure that consistent sampling methodology is applied by different organisations throughout the life of the building. It addresses when, where and how samples are obtained, of which impact on the results of water analysis and its interpretation. For example, does a sample represent the situation at a particular outlet or that of the whole building? 'When' a sample is taken is crucial: the result from an 8am sample will be different to a 10am sample when users will have been drawing a significant amount of water out of the system. And 'how' a sample is taken will heavily influence results if two samples are taken in different ways.

The new standard provides a consistent way of taking samples for both lab and test kit analysis. It deals with collection, storage and transport of samples for analysis of anything that could possibly be present in water – both chemical and microbiological – but excludes methods of analysis and water quality criteria.

Reasons for sampling including: for compliance with specifications and regulations; before handover and occupancy; for delivering better water quality than the wholesome product delivered by the supplier; incident investigation; and confirmation that water quality controls are effective. BS 8554 excludes investigation of legionella outbreaks, which are covered by BS 7592, but does not exclude the possibility of sampling for legionella within these contexts.

BS 8554 also discusses the importance of sampling plans, including appointment of a 'responsible person' and outlining a risk assessment for the sampling process, and sets out a regime clarifying when to take pre- and post-flush samples (Figure 4 - as shown in the Winter 2016-17 edition of **waterline**).

Answers by Elise Maynard, Elise Maynard Associates

introducing people
who are an active
part of the WMSoc



John Newbold

John up until recently worked for 25 years in the Health and Safety Executive's Biological Agents Unit as a Principal Specialist Inspector, accumulating a wealth of regulatory experience. John was HSE's Infectious Diseases Portfolio Holder which combined his microbiological knowledge and expertise with an important regulatory role. In addition to his work with infectious diseases, John spent much of his time working in the field of Legionella control and was Chair of HSE's Legionella Technical Working Group and a member of HSE's Legionella Committee. He also worked closely with a range of key Government departments and industry sectors and through extensive stakeholder engagement, regularly presented at key Industry events to promote compliance and raise awareness around legionella assessment and control including LCA, WMSoc, BACS, IHEEM, H&V and many other forums.

John has a strong scientific and technical background, and is recognised as a regulatory expert in legionella and the development of operational and enforcement policies. John has advised Government and professional bodies both within the UK and overseas.

John has worked closely with LCA and WMSoc over many years, specifically representing HSE on the LCA Management Committee. Since leaving HSE in June 2016, John has become an independent consultant and is also an LCA assessor, acts as a tutor on WMSoc training courses and retains an active role on WMSoc's Rapid Microbiology Working Group.

course in brief W019

TITLE: Legionella Training for Duty Holders & Responsible Persons incorporating L8

AIMED AT: Those requiring introductory knowledge on the main aspects of legionella and Legionnaires' disease.

It is essential for dutyholders, responsible persons and those who are responsible for, use or operate, any water system that is capable of growing and emitting legionella bacteria.

OVERVIEW: To give detailed legionella training to owners and operators of systems in order to meet the demands of health and safety regulations and the risk assessor. Includes instruction in the Practical Training Area.

WHAT OUR DELEGATES SAY:

"Professional, well run & informative"
"Covered everything required"



Closed Systems - WMSoc event abstracts | Thursday 30th March 2017 - SCI, London

Matt Morse, CSCA - Closed System Control Association - Objectives and Purpose

Closed system water treatment; what is the point? At a previous WMSoc conference in 2016 some of the questions from the floor included the following:

- Surely they're sealed, why bother with them?
- If chemicals are used there won't be any corrosion?
- I've got a no maintenance magic gadget
- By the time the problems come to light whoever is responsible will be long gone
- A British Standard doesn't mean you have to do it!
- It's not going to kill anybody!

To deal with each point individually:

Sealed systems - There is no such thing as a truly closed system and they will all make up with fresh water from time to time. This is fresh oxygenated water with nutrients for bacteria and potential for corrosion. From time to time there will be leaks and maintenance drain downs. No system is sealed forever.

Use of corrosion inhibitor chemicals does not mean all corrosion stops. Corrosion still occurs at a much reduced rate and this will still generate corrosion products. Treatments are not always stable over the long term. Glycols will degrade especially at levels <20%. Degradation of Nitrite based inhibitors is well known. Microbiological contamination can cause other issues like blockages, reduced heat transfer and under deposit corrosion

No magic gadget in the form of technology, magic or witchcraft is infallible and everlasting. Monitoring is still required or else how can you be sure the magic is still working?

By the time the problems come to light whoever is responsible will be long gone; maybe so, but you may still end up holding the baby. If you are a building owner or operator you still need your building to work – you will need to take action. If you're a service provider how can you demonstrate your competence and quality of service when questions are asked?

British Standards are not law unless cited in law but they are recognised good practice. In litigation the court will look to accepted industry practice as the "standard" that would be expected to have been reached. Working to recognised standards is a common sense way to avoid litigation.

It's not going to kill anybody! Various scenarios were discussed where issues in a primary LTHW system could lead to a Health or Safety issue in HWS secondary.

- Corrosion leakage cross flow scalding at taps
- Chemical leakage to secondary poisoning
- Corrosion deposit reduction heat transfer to HWS legionella issues

There could be questions to answer under HSWA 1974 if a duty holder was not looking after the primary system properly. Closed system litigation is also estimated to cost far more than financial penalties for just killing somebody!

Given the ambitious government Carbon Dioxide reduction targets and the expense of new infrastructure it makes sense to maximise energy efficiency wherever possible. Its estimated that >10% of the energy used in a closed system can be wasted due to inefficiency that could be reduced by simple water treatment. Would 10% of your energy cost pay for your closed system treatment?

Closed systems obviously need to be looked after; is it done properly at the moment? Sometimes it is, often it's not. There is ignorance in the industry of the standards and guidance that do exist and there is a perception of low importance among service providers and service users alike. Until bitten by a low frequency high cost event many think closed systems are unimportant. How long can your business function without heating or cooling?

The CSCA was born out of the realisation that despite excellent standards and guidance being available there was a gap in industry quality and knowledge.

Various stakeholders came together to create the organisation and the management committee includes the following:

- Mark Branson - Carillion
- Martin Ronceray - BSRIA
- Roger Carlin – Commissioning Specialists Association
- Alan Edwards – Independent
- Garry Kerin – Mitie
- Elise Maynard – Water Management Society
- Matt Morse – British Association of Chemical Specialties
- Pam Simpson – Institute of Corrosion
- John Smith – Independent
- Heather Read – (Secretariat)

The CSCA is a non-profit membership organisation for companies who actively support and demonstrate a sound approach to the control of water quality in closed systems. Our objective is to upgrade the standard of service supplied by the water treatment service provider and Pre-commission and Remedial Cleaning companies and we are a standards organisation for our members

We have taken the British Standard and the BSRIA guidance and distilled the requirements into simple checklists to achieve compliance. This helps our members with gap analysis to ensure there is no shortfall in their management process for closed system work. We then audit service provider members to ensure they are using the systems they have put in place.

Different grades of membership are offered:

Organisation Type	Category	Proposed Annual Membership Fee
Service User e.g. FM company, Building Owners, etc.	Sponsor Member	£500
	or Founder Member	£1000
Service Provider e.g. WT/ Cleaning Companies etc.	Registered Member and Founder Member (optional)	£500 per category plus £1000
Other e.g. Laboratories, chemical & equipment suppliers, etc.	Sponsor Member	£500
	or Founder Member	£1000

Registered service providers are the companies that commit to the code and the service standards. Founder members and sponsor members are companies that are involved in closed systems but not necessarily service providers. These currently include: independent consultants, chemical manufacturers/blenders, test kit manufacturers and equipment manufacturers.

Founders and Sponsors are involved with the organisation but we cannot endorse their products and services. We will direct enquiries to the Founders page when asked for recommendation on services.

Registered Service Providers are committed to the CSCA with a statement of compliance, submission to auditing of their procedures and agreement to be subject to the disciplinary procedure.

The service standards, code of conduct and related documents are available on our website: www.cscassociation.org.uk

Service provider members of the CSCA commit to having auditable procedures for:

1. Allocation of responsibilities
2. Training & competence of staff involved
3. Programme design
4. Communications and Management
5. Record Keeping
6. Reviews
7. Internal Audits
8. Control of Subcontractors

Being a member of the CSCA demonstrates your capability to the end user and helps raise standards within the industry.



Jill Cooper, Suez - The role of sulphate reducing bacteria (SRB) in microbially induced corrosion

The role of SRB's in microbially induced corrosion and the possible consequences and cost is not fully appreciated. Hopefully the next half hour will give you an appreciation of the potential effect of SRB's on pipework and the potentially devastating outcome if these bacteria and other in these systems are not controlled correctly.

Geoff Walker, WMSoc - Treatment options and how to minimise risk

Geoff's presentation provides information and guidance on the various chemical and physical treatment options that can reduce the risks of corrosion and fouling and maintain system efficacy, within closed water systems.

The presentation discusses how a water treatment programme should be developed, initiated, controlled and monitored. Typical treatment chemistries are discussed with information of their pros and cons, to aid selection.

Biocides and the implications of the EU Biocidal Products Regulation on their future applicability and legality, for use in closed systems, are covered in some detail.

The presentation moves on to discuss the applicability or otherwise of non-chemical treatments.

Water programme chemistry testing, including interferences in testing methods, and guidance on testing schedules both for on-site and laboratory analyses are covered as is the use of condition monitoring to confirm that the programme is performing as designed. A final slide gives details of the desired outcomes from the use of a water treatment programme.

Les Bekesi, Lend Lease - Design, installation & protection of closed loop systems

Know and understand the calibre of the contractors that you are contracting with on the project, ensure that they have the correct competency for the work that is to be carried out for you. Lowest price is no guarantee that they can do the job and unless you validate their competency and capability you should discount them or risk being in breach of the Law.

When designing a system ensure that the whole system is thought about, make sure that you know all the material types being used and that all are compatible. Think about the water treatment and that this is selected on the full range of kit and materials that form the system. This understanding of the whole system is critical when looking at partial refurbishment or extending existing systems.

Banned products like lead solder on potable water are obvious but as some fluxes are also known to promote bacterial growth why risk using it on non-potable systems, where bacteria can still cause corrosion and blockages in the system?

The same is true with EPDM flexi hoses which are WRAS approved but banned by NHS in potable water, but we still use them all over non potable systems and they will again promote bacterial growth. A FCU with chilled and LTHW supplies via flexi hoses is a standard design and if the unit is not calling for heat or cooling then the water in these runs will stagnate at the temp of the surrounding environment, 20 – 25degc, just in the growth range and with a nutrient rich pipe to sit in. What damage can this do to commission valves and other plant within the system?

The big one though is on complex systems when and how do you introduce water and what do you do with it once it is introduced, so as not to heavily contaminate the system? It is impossible to not introduce water till the last minute, as we need to close up walls and ceilings and have tested and proven systems before the end of the project. Again ensure that the contractors used to clean the system are competent and check results of what they do. Many issues are arising across the industry due to incorrect cleaning and commissioning of systems.

Dr Pamela Simpson, Whitewater Technologies Ltd - Pre-commissioning cleaning process and what can go wrong

Pre-commission cleaning of closed circuit pipework systems and the subsequent monitoring of water quality are essential in any building. The implications of getting these wrong can be catastrophic. The resulting problems include disruption to occupants whilst systems are re-cleaned or, in the worst cases, complete closure of buildings whilst entire systems are ripped out and replaced due to early failure. But it seems that although the risks associated with open systems (where the circulating water might come into contact with humans) are generally appreciated, there is less awareness of the problems that can affect closed systems.

A closed re-circulating pipework system is one which, as the name implies, is closed i.e. the water in them is not exposed to the atmosphere and is not significantly depleted due to evaporation or draw-off. The water is permanently enclosed and typically spends all of its time being heated, cooled and re-circulated in the process of delivering heating or cooling. The potential problems start during construction. In large buildings, heating and cooling circuits can include pipes that are over a metre in diameter. In an ideal world, these pipes would be installed in a clean, debris free condition but in practice, nothing can be ruled out. Large items left inside pipework during construction can cause major damage to expensive boilers, chillers and pumps. Smaller particles can be just as sand, grit, jointing material or welding slag can cause blockages of valves and consequent heating or cooling dead spots. All of this debris should therefore be removed by dynamic flushing of the system during pre-commission cleaning. But successful removal of these items does not end the danger and circulating highly oxygenated water through the pipes at high velocity can potentially encourage corrosion. The use of corrosion inhibitors is essential to protect the metal surfaces from corrosion.

All natural sources of water (including mains water) contain many different types of bacteria, some of which may multiply and lead to problems within closed systems if they encounter suitable conditions for growth. Mild steel, stainless steel and copper are thought to be particularly prone to microbial influenced corrosion (MIC). For MIC to occur, it is necessary for some types of bacterial species to colonise the metal surface. The anaerobic conditions enable anaerobic bacteria such as sulphate reducing bacteria (SRB) to multiply and a potential difference is established between different areas of the metal surface. This results in accelerated, localised pitting corrosion and eventual perforation of the pipe. Other bacteria of concern are nitrate/nitrite reducing (NRB) and nitrite oxidising bacteria. These bacteria can cause rapid loss of nitrite-based corrosion inhibitor from the system and so increase the risk of electrolytic corrosion.

During the pre-commission cleaning stage of any new build, it is therefore important to prevent microbial presence wherever possible and to avoid areas of low flow rate or dead legs where bacteria can multiply, settle and develop biofilms unhindered by circulating biocide chemicals.

Chris Parsloe, Parsloe Consulting Ltd. - Post-clean: Fit for the future?

This presentation addresses the events that are necessary following completion of the pre-commission cleaning process. The presentation focuses on the requirements of the latest guides BG29/2012 Pre-commission cleaning of pipework systems, BG50/2013 Water Treatment for closed heating and cooling systems and British Standard BS8552 Sampling and monitoring of water from building services closed systems. These guides underwent a major revision specifically to address the issues that typically arose following completion pre-commission cleaning. These issues are explained and the key points of the resulting new guidance are summarised. The principles for sound on-going monitoring of water quality are also explained.

**LOOK OUT FOR THE CLOSED SYSTEMS
EVENT REPORT IN THE NEXT EDITION
OF WATERLINE.**

event report e

Keeping Healthcare Water Safe: including updates on guidance and its implementation

Wednesday March 15th 2017 Royal Society of Public Health, London

This one day seminar was held in collaboration with Public Health England (PHE), chaired by Dr Susanne Lee and was followed by a meeting of the RSPH water special interest group.

The first presentation from Graham Thompson of Oculus Consulting Ltd, was entitled "It's a new build, the water system must be safe? The pitfalls of poor design implementation and commissioning" Graham discussed the wealth of guidance available from a variety of sources and some specifics from Health Technical Memorandum (HTM) 04-01 and some of the British Standards. These were illustrated by some excellent images from real-life installations demonstrating some of the examples of problems noted during audit and inspection visits. His suggestions were to:

- Involve personnel with experience of water systems involved in the initial design
- Audit against design and published guidance at installation stage and regularly throughout the build
- Ensure the contract requires changes to be actioned
- Implement a Water Safety Plan (WSP) approach before the water systems are handed over
- Minimise the period after water pressure testing prior to "use"
- Flush, or chemically dose, cold water outlets regularly
- Agree a budget to run the hot water at operational temperatures as soon as insulation is in place
- As the building becomes occupied, don't forget that the water systems cross wall, wards and floors

Dr Sam Collins from PHE presented about "Thinking outside the box – other sources of waterborne infection". He showed a variety of papers dating back many years, sadly showing that we are still only just getting to grips with the importance of water on the transmission of various Healthcare Associated Infections (HAIs). It is estimated that between 200-1200 litres of water are used per bed per day and he noted that although some hazards that may compromise water quality are relatively obvious, others may be more concealed. Sam showed a number of *Legionella* cases related to water births, hydrotherapy and ultrasonic nebulisers, but also a case of aspiration related to water in infant formula milk. He then discussed outbreaks due to other microbes such as *Burkholderia cepacia* linked to contaminated water used to prepare a mouthwash and *Pseudomonas aeruginosa* related to the use of bath toys.

The PHE environmental investigation of *Mycobacterium chimaera* contamination of heater cooler units used in cardiac surgery was then discussed in detail. Sam also advised to be aware of unintended consequences of trying to prevent problems by the use of POU filters and/or fitting more sinks. Any actions need to be monitored and appropriate maintenance undertaken. He ended his presentation by discussing the increase of multiple drug-resistant bacteria being found in sink traps and the latest work being undertaken by PHE. His closing remarks were:

- It's not just about what's coming out of the taps, it's how that water is used
- Review any additional risks that may be introduced by "unintended consequences"
- Consider all transmission routes for water
- Water can carry organisms onto surfaces, which can then contaminate other areas
- Water quality is controllable and thus many HAIs are preventable

He noted that water supply needs to be considered in its entirety from point of entry to point of use and comprehensive plans should be put in place for:

- All the equipment that uses water and could become contaminated
- Risk assessments
- Patient exposure

- Water quality monitoring

This should be performed in conjunction with the Water Safety Group (WSG) and other knowledgeable allied professionals.

The conference then moved on to discuss more specific elements related to endoscopy and decontamination of related equipment. Dr Jimmy Walker, also from PHE, reviewed recent changes to decontamination guidance and why the documentation had been updated. This was due to the Advisory Committee and Dangerous Pathogens Transmissible Spongiform Encephalopathy Subgroups general principles of decontamination (ACDP-TSEs Annex C). This recommends *in situ* testing for residual proteins on instruments due to the continuing risks of the transmission of prions, as well as the removal of ninhydrin and swab tests. Dr Walker explained some of the factors behind prions and Creutzfeldt-Jakob disease and the potential for transmission via dentistry, blood transfusion, neurosurgery and ophthalmology.

The CFPP 01-01 guidance has reverted to the HTM format:

HTM 01-01 requires an optimisation plan for the cleaning performance of washer disinfectors. In terms of residual proteins:

- Introduce a daily process challenge device (when available)
- Do not use swabbing
- Continuously monitor residual protein
- Residual protein detection devices should be CE marked
- Prioritise implementation of high risk instruments by July 2017

HTM 01-06 update for endoscopy requires:

- Reinforcement of bedside clean and time lines
- Decontamination of Endoscopic Retrograde Cholangio-Pancreatography (ERCP) equipment
- Introduction of a Process challenge device
- Controlled environment storage cabinets
- Portable storage systems
- Removal of swabbing and ninhydrin

This was followed by Tina Bradley discussing "Endoscopy – Is your washer disinfectant safe to use?"

Tina showed images of typical complexities of endoscopes and the types of bacteria that they have been shown to harbour and which have led to a variety of infections and outbreaks. The use of endoscope washer disinfectors (EWDs) should provide a standardised method of decontamination, however a certain amount of manual cleaning is required prior to this. Maintenance of all items of equipment is essential and it must be established that all channels of the endoscope are irrigated during washing. EWDs must be tested on installation and at regular intervals and any problems investigated. Design must ensure that there is no water stasis and that the water supply is of a very high quality. Water treatment methods may include:

- 0.2 um filtration
- Reverse osmosis
- Biocides
- Ultraviolet (UV) light
- A combination of methods

HTM 01-06 Part E gives advice regarding water testing, some tests are annual e.g. pH, others weekly e.g. total viable counts (TVCs) or quarterly e.g. *Pseudomonas aeruginosa* or environmental mycobacteria. These latter two should possibly be undertaken more frequently and any data used for trends.



Questions to be asked may include:

- Who will carry out the testing – technicians, estates or service provider?
- Is there a method statement describing aseptic technique?
- Where is the sample taken from?
- How is the sample transported?
- Who receives the results?
- Are the results presented in an understandable format?
- Who should take any actions required?
- What actions should be taken?

In summary, departments should ensure that all equipment, including the water treatment system, is regularly maintained and validated in accordance with national guidance. A review of the agreement with the contract laboratory may be required and an action plan in case of contamination is advised.

The next two presentations were regarding hydrotherapy and birthing pools. Sarah Wratten, a clinical specialist in aquatic physiotherapy from the UK Ministry of Defence presented an overview of the updated Pool Water Treatment Advisory Group (PWTAG) hydrotherapy pool guidelines 2017. She gave some definitions of hydrotherapy and explained that the ideal temperature is 34-35°C, thus giving additional challenges compared to swimming pools. The governance required falls to the WSG according to HTM 04-01 but also needs to include a Pool Safety Operating Procedure (PSOP). Any risk assessments need to be specific to the area and include:

- Reviewing existing controls
- Training of staff
- Good design and hygiene
- Assessment for potential hazardous events
- Bather load

Ongoing surveillance requires good communications between all the stakeholders and accurate daily logs. Hydrotherapy pool design needs to consider disability requirements but also sufficient activity space to include the physiotherapist. They should be easy to clean and provide good staff visibility and she provided a number of key recommendations in relation to accessibility.

With regard to microbiology she advised a minimum of weekly and prior to patient use, to confirm that the treatment is effective. Certain patient groups (such as new babies) may require additional monitoring. Chlorine is the only recommended disinfectant but the lowest dosing should be used, in combination with good design and hygiene (users need to be educated too). Secondary disinfection with UV may provide an additional barrier where filtration standards are poor.

In conclusion she advised that the new guidelines take account of the design and operational requirements for all patient groups to minimise the risks to patients, staff and external users. They align with the latest Department of Health guidance. A PSOP should be developed for all pools, to include a risk assessment for all users (including external user groups). Appropriate training should be provided for all staff in pool water risks and management.

Dr John Lee then followed up regarding keeping birthing pools safe. He reviewed the 2014 joint guidelines from the American Academy of Pediatrics (AAP) and the American College of Obstetricians and Gynecologists (ACOG). In the same year the National Institute of Clinical Excellence (NICE) published a clinical guideline "Intrapartum care for healthy women" which advises to "Keep baths and birthing pools clean using a protocol agreed with the microbiology department and, in the case of birthing pools, in accordance with the manufacturer's guidelines." In reality there appear to be very few reported cases of disease and the majority of evidence is that the risk is no greater than a non-water birth. John described four cases of Legionnaires' disease and one of sepsis due to *Pseudomonas aeruginosa*. Following on from the latest case of neonatal Legionnaires' disease from a home birth in England, PHE undertook an investigation and a patient safety alert was issued stating that heated birthing pools filled in advance of labour should not be used for home births. The full report can be accessed from:

www.researchgate.net/publication/281171509_Heated_birthing_pools_as_a_source_of_Legionnaires%27_disease

The main problems are:

- Quality of water used to fill pool
- Operating temperatures
- Contamination with body fluids
- Inadequate draining

Precautions should include:

- Absence of pathogens – particularly *Pseudomonas aeruginosa* and all *Legionella* species
- Good management and control of supply water
- Disinfect or replace any flexible shower hoses between use
- Any thermostatic mixing valves should be capable of disinfection
- Bacterial filters with suitable flow characteristics could be considered
- Easily accessed and suitable surfaces for cleaning
- Adequate drainage
- Fresh liners and plug for each use
- No recirculation water
- Clean, disinfect and dry after every use
- Run taps and flush through prior to filling

Marcus Rink from The Drinking Water Inspectorate, discussed keeping drinking water quality safe within healthcare building water systems; chemical and microbiological challenges. He reviewed a number of EC and UK directives and legislative responsibilities and defined the provision of wholesome water. Healthcare premises are specifically classified as a public building but their water supply cannot be cut-off or restricted and provision must be made for emergencies. He described the various hazards and mitigations for both public, private and other source water, as well as secondary treatment, storage, distribution and delivery. With regard to system design and maintenance he suggested to consider:

- Design in flow to avoid stagnation
- Avoid long pipework with dead ends
- Proximity of cold pipes to hot pipes
- Assessment of materials through which pipes traverse
- Proximity of residual electrical currents
- Temperature control
- Use of unsuitable materials in plumbing
- Never have open water storages
- Pipe markings to stop cross-connections
- Proactive and responsive management, maintenance and repair

George McCracken from Belfast Health and Social Care Trust and Dr Paul McDermott from PJM-HS Consulting Ltd discussed practical elements of training and HMT04-01 implementation as part of lively panel discussions at the end of the afternoon. George discussed the various requirements for training vs organisational requirements, as well as different training methods. For certain areas of his organisation multi-skilling and job awareness are key and so they have developed bespoke training for different staff groups, but the outcomes are all measurable, relevant and effective. Paul led a discussion on different sampling methods for different bacteria and mentioned that there are a variety of new rapid testing methodologies becoming available. Much discussion was held regarding the value and frequency of microbiological testing. The debate became even more animated when the subject of TMVs and scald risk was raised – it is clear that this topic will continue to be the cause of much discussion for some time yet.

The next RSPH conference will be held on 18th May 2017 regarding Food and Food Safety followed by a two day conference 29-30th June 2017 on Keeping International Travellers Healthy – meeting the public health challenge.

Elise Maynard, IPC / Vice Chair WMSoc.

THE BIOCIDAL PRODUCTS REGULATION (BPR) AND WATER TREATMENT

This article, written by BACS (the British Association for Chemical Specialities), gives some insight into aspects of the Biocidal Products Regulation, the regulatory regime for biocides in the EU, and its relevance to the water treatment sector.

A biocidal product, broadly speaking, is one which controls harmful or unwanted organisms through chemical or biological means. Common examples of such products are disinfectants, wood preservatives, insect repellents and the biocides used in water treatment. The BPR, just as its predecessor the Biocidal Products Directive did, sets out rules for the authorisation of biocidal products to allow them to be made available on the market and to be used in the applications they are intended to be used in, as well as rules for the approval of their active ingredients, in order to ensure a high level of protection for human health, animal health and the environment.

Under the BPR the use applications of biocidal products are classified into 22 product types (PTs), the main PTs and their scope concerning water treatment being as follows:

PT 2	Disinfectants and algaecides not intended for direct application to humans or animals, with usage areas including, inter alia, swimming pools
PT 5	Drinking water disinfection
PT11	Preservatives for water and other liquids used in cooling and processing systems
PT12	Products used for the prevention or control of slime growth on materials, equipment and structures used in industrial processes

As well as biocidal products, articles treated with or incorporating biocidal products, referred to as Treated Articles, fall within the scope of the BPR, examples being some water fittings introduced in recent years especially targeted at healthcare facilities.

The first phase of the BPR concerns the active ingredients used in biocidal products, referred to as Active Substances. All existing Active Substances used in biocidal products must be in the "Review Programme" of the BPR which ultimately leads either to their Approval, allowing them to remain

available on the market, or non-Approval and their ultimate withdrawal. To ensure that all sources of Active Substances are supported by dossiers with data on the active substances, Article 95 of the BPR prohibited from 1st September 2015 the making available on the EU market of a biocidal product unless the active substance supplier is included in a list, referred to as the Article 95 list, for the PT to which the product belongs.

There is an exception to this prohibition where, and cases of this are rare, the chemical description of an Active Substance has been redefined since its inclusion in the Review Programme and as a consequence it is not yet included in the Article 95 list. Subject to certain criteria, such a substance may continue to be sourced even though absent from the list.

Apart from this exception, if your supplier of an active substance is not on the Article 95 list as a supplier of that active substance for the product type that covers the intended use of your biocidal product, then it is illegal to use the active substance supplied by that supplier in the biocidal product. Whilst this applies to those who formulate their own products, the principle extends to those who buy them in, and it is important to note that the point of compliance is the making available on the market of the biocidal product.

The Article 95 list of active substances and suppliers can be found on the website of the European Chemicals Agency (ECHA), which, along with authorities in EU member states, manages the implementation of the BPR. An internet search for "ECHA Article 95 list" will provide a link to access the list, which is updated regularly and, therefore, worth checking from time to time.

The second phase of the BPR is the authorisation of Biocidal Products. Once the ECHA Biocidal Products Committee has issued an opinion on an active substance, having evaluated the dossier submitted on it, an Approval date will be set by which date dossiers must be submitted for all biocidal products containing this active substance, for the relevant PTs, to an EU member state Competent Authority (CA), such as the HSE in the UK. In cases where a biocidal product contains more than one active substance, the submission date deadline is the last Approval date for the active substances in the biocidal product.

The compilation of a dossier for a biocidal product requires a substantial amount of information on

the chemistry of the product, including Human Health Risk Assessments, Environmental Risk Assessments and efficacy data, to demonstrate safety and effectiveness against target organisms. These data must support any claims made for the biocidal product. For example, if no data are submitted for efficacy against legionella then no claims regarding the control of legionella may be made for the product.

It is also a requirement, for the evaluation of the product dossier, for it to provide data on the active substance. If this data is not in the possession of the submitter of the biocidal product dossier, permission must be obtained from the supplier of the active substance for the CA to access the supplier's data to evaluate the biocidal product dossier, this permission being referred to as a Letter of Access.

The BPR provides for various ways of making a product available on the market. The submission of a biocidal product dossier allows the applicant to maintain control of all branding and product names on the packaging. This of course comes at a high cost. There are alternatives to the full submission route and these usually include working closely with your supply chain. One such alternative is known as a Same Biocidal Product Authorisation. With this, the applicant has an identical product to that of the supplier he is being supplied by but becomes the person holding the Authorisation. This gives a degree of freedom over what is actually placed on the market and, more importantly, the opportunity to make minor changes over time. This route requires a letter of access to the supplier's product dossier. A further alternative is to "piggy back" on the supplier's Authorisation by using "parallel trade" where the Authorisation holder lists the seller's brand on his own Authorisation. This is probably the lowest cost route but it must be remembered that the seller is never the Authorisation holder and that the Authorisation holder's details must appear on the packaging.

Some may choose to resell branded products the authorisations for which are owned by others and lose their own branding in the market.

Whichever route is chosen, products can only be used in accordance with their Authorisation which may mean changes to applications products are sold for and methods of dosing.



The above gives a picture of some elements of the BPR, whose impact is now being felt by BACS Water Treatment Group (WTG) members, who include active substance manufacturers, blenders and service providers. Whilst Approval dates have still to be determined for some Active Substances in the Review Programme, focus has moved to the authorisation of biocidal products themselves. The Approval dates, past and future, for some Active Substances of interest to the water treatment sector and, therefore, the deadlines for the submission of dossiers for the authorisation of Biocidal Products based on them, for the main water treatment (and other) PTs, are shown in the table below.

Active Substance	PTs	Deadline
Iso-propyl alcohol	2 (also 1 & 4)	1 July 2016
Glutaraldehyde	2, 11 & 12 (also 3, 4 & 6)	1 October 2016
Hydrogen peroxide	2 & 5 (also 1, 3, 4 & 6)	1 February 2017
Mixture of CMIT and MIT	2, 11 & 12 (also 4, 6 & 13)	1 July 2017
Peracetic acid	2 & 5 (also 1, 3, 4 & 6) 11 & 12	1 October 2017 1 July 2018

If a biocidal product dossier deadline is missed, the product supplier can continue to supply the product for 180 days, after which the end user has a further 185 days to stop using it, unless of course the biocidal product contains a second active substance with a later deadline for product dossier submission. Whilst a dossier can be submitted after the deadline, this product withdrawal process still applies resulting in the product effectively being off the market for around three years.

BACS sector groups, particularly the Biocides and Biosciences Group (BBG) regarding the BPR, provide forums for discussing developing regulatory issues and to help members understand regulatory requirements, such as the process for biocidal product dossier submission and what needs to be done both in principle and in detail.

As well as providing members with a wide range of information, BACS represents their interests by working to shape and mitigate the impact of legislation and regulatory policies through engagement in the UK and involvement at the European level. Data demonstrating the efficacy of a biocidal product is a key element of a product dossier. BACS has been, and continues to be, very active in the development of efficacy guidance for the product types relevant to the water treatment sector, such as PT11, which includes biocides used for cooling towers and closed systems, via its involvement with both EBPF, the European Biocidal Products Forum sector group of Cefic, the main voice of the chemical industry in Europe, and CEN, the European Committee for Standardization, the European organisation which develops test methods and standards.

And of course there is Brexit. BACS has been working since the referendum to try to shape Brexit negotiations and the post-Brexit landscape, directly with BEIS and Defra, and with other associations in the Alliance of Chemical Associations. In the context of the BPR post-Brexit, the mutual recognition of Active Substance Approvals and Biocidal Product Authorisations and options for a selective approach to the implementation of the BPR in the UK in areas not relating to requirements for trade with the EU, where regulating differently would benefit companies operating in the UK, are examples of key considerations.

So in conclusion, as the choice of biocidal active substances in the formulator's armoury continues to be reduced, BACS remains active at both the UK and EU levels in lobbying to try to influence the implementation of the BPR and the post-Brexit landscape to the benefit of members' interests.

The British Association for Chemical Specialities (BACS) is a trade association whose members operate in the speciality chemicals sector of the chemicals supply chain.

BACS has around 130 members, from multi-nationals to SMEs and sole traders, including chemical manufacturers, ingredient suppliers, product formulators, distributors, retailers and service providers.

BACS operates a range of sector groups to cater for the diversity of members' interests, one being the Water Treatment Group (WTG), which provides a forum for members manufacturing and supplying speciality chemicals, equipment and support services for all aspects of water treatment to keep abreast of and influence legislation and industry standards which affect their businesses. The WTG chairman, Tom Laffey, will be known to many WMSoc members.

More information on the Association and membership may be found on its website at:

www.bacsnet.org

or from the BACS office at:

enquiries@bacsnet.org



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GAIN A CPD POINT BY ANSWERING THESE QUESTIONS ON THE ECONOMIC AND ENVIRONMENTAL CASE FOR SUSTAINABLE WATER MANAGEMENT ARTICLE

Q1: Name four of the key issues concerning the Current Global Environmental Position?

Q2: What form of membrane technologies is fast becoming the new workhorse for a wide range of industrial water cleanup programs?

Q3: Name four of the key water issues to consider regarding the economic and environmental case for sustainable water management?

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

The answers will be published in the Summer 2017 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**.



SWIMMING POOL TECHNICAL OPERATOR (SPTO) TRAINING COURSE

The Swimming Pool Technical Operators course is a 3 Day program which covers all aspects of Pool Plant management and is accredited by the UK Pool Water Treatment Advisory Group (PWTAG).

The SPTO aims to enable candidates to have an understanding of Pools, Spas, Interactive Water Features and much more, including good management principles of pool plant operations, water quality management and health and safety requirements.

The SPTO Syllabus includes:

Legionella section delivered by The Water Management Society:

- Legionella Awareness & Microbiology
- Legislation
- Approved Code of Practice L8
- Prevention & Control (HSG 274/HSG282)
- Domestic Services
- Other Systems
- Spa Pools

Section delivered by Brio:

- Swimming Pool Design
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- Filtration
- Pollution and hygiene
- Management, regulation and training
- Primary disinfection
- Secondary disinfection
- Dosing chemicals
- Pool water chemistry
- Testing and controlling pool water chemistry
- Healthy swimming – the health risks
- Preventing outbreaks
- Microbiological testing
- Plant maintenance
- Cleaning and hygiene
- PPE and plant room emergency procedures
- Spa pools

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CASE STUDY

St Richard's Hospital Chichester

Western Sussex Hospitals NHS Foundation Trust

Providing a full range of acute hospital care including:

A&E, acute mental care, maternity, outpatients, day surgery and intensive care

Horne's ILTDU has proven its effectiveness in service with persistently colonised outlets in a growing number of UK hospitals. One example is St Richard's Hospital in Chichester. During 2013, contamination of a shower outlet with *Pseudomonas aeruginosa* was identified. The shower and inlet hoses were replaced and the problem appeared to be resolved. However, it was discovered two years later that the colonisation had re-established. To ensure continued patient safety, the Estates team employed point-of-use filter filtration handsets, which trap waterborne bacteria such as Legionella and Pseudomonas to deliver clean, safe water. Electronically-controlled, the colonised shower could also be programmed to perform a daily duty flush and thermal disinfection function to kill any present bacteria. However, despite repeated thermal disinfection operations, this failed to completely rid the outlet of the *Pseudomonas* colonisation.



The Estates Workshop Manager, recognised that the relatively short time to colonise the new shower and the failure of its in-built thermal disinfection to remove the contamination suggested that the colonisation likely extended back up into the cold water pipework feeding the shower. The in-built thermal flush could only address colonisation of part of the shower valve and the downstream fittings; therefore it was quickly re-seeded from the untreated upstream colonisation in the cold water supply pipework.

It is now accepted that *P. aeruginosa* can establish biofilms in the last 2 metres of pipework. That, however, was of little comfort as the pipework feeding this particular shower was completely inaccessible as it vanished into a solid ceiling. Various options were under consideration when he received a telephone call, requesting an appointment to show him a new product – the Horne In-Line Thermal Disinfection Unit (ILTDU). This has been designed as a standalone product to be installed upstream of a thermostatic mixing valve, tap or shower, specifically to deal with *Legionella* and *Pseudomonas* colonisations and can work with any make of TMV, tap or shower, not only a Horne product. This had the potential to solve a seemingly intractable problem and if installed in the pipework upstream of the shower, then it had the potential to treat the shower valve and its downstream fittings as well as the cold inlet pipework where the colonisation was believed to reside.

Therefore a decision was made to have it installed on the supply pipework to the problem shower, crucially, located some distance upstream of the shower, beyond the solid ceiling barrier. Not long after disinfection, the Workshop Manager had what he describes as a 'Eureka moment' when, for the first time since the problem re-emerged, the results of the water sampling came back clear.

Initially disinfection was implemented using the ILTDU on a monthly basis and after 3 months he was delighted at the consistently clear results. He also noted some additional benefits of this approach – he did not have to close off the ward area to patients to dig out and replace embedded contaminated pipework from a solid ceiling, and so avoided the expense, inconvenience and inevitable disruption to the delivery of healthcare.

They were also able to eliminate the ongoing consumable cost of the ongoing requirement for point-of-use filter handsets that required changing, at most, every 70 days. Also greatly reduced, are the costs associated with laboratory analysis of each water sample - in fact, with a 3 monthly disinfection regime now in place, a bi-annual water sample test is all that is now required. The Workshop Manager confirmed that the ILTDU had paid for itself remarkably quickly. His final words on the ILTDU are perhaps the most gratifying – he said 'It gave us the opportunity to resolve our water hygiene problem, allowing us to provide our patients with safe clean water at a time when our patients are most vulnerable.'

At the time of writing, in July 2016, the Hospital is still experiencing zero counts from the previously persistently colonised shower and is fully satisfied with the ongoing performance of the Horne ILTDU.



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CONTRACTS, PRODUCTS & PUBLICATIONS

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World's largest tidal turbine

Orkney based Scotrenewables Tidal Power launched the world's largest and most powerful energy generating tidal turbine, the 2 MW SR2000, a 550 tonne machine at Harland & Wolff Heavy Industries in Belfast, last May.

The turbine underwent preliminary trials in Belfast Lough before being towed to the European Marine Energy Centre (EMEC) in Orkney, where it has commenced a grid-connected test programme. The turbine design follows Scotrenewables' floating generating platform philosophy, which the company expects will deliver a step-change cost and risk reduction to the tidal energy sector.

In November, Scotrenewables Tidal Power won the award for 'Best Grid Connected Prototype' at the International Tidal Energy Summit in London, for the SR2000.

Speaking at the event, Andrew Scott CEO said, "On behalf of the whole team I'm delighted with this recognition. The SR2000 has been a leap forward for the technology and presented a huge challenge for the team, and it's a credit to them individually and collectively that we're on the road to demonstrating some of the clear advantages our technology brings to the tidal sector at full scale."

Record breach sewage spill fine

Southern Water has been fined a record £2 million after raw sewage was discharged into the sea at popular Kent beaches over the Queen's Diamond Jubilee bank holiday weekend.

The water company failed to inform the Environment Agency of the spill until more than 24 hours after it began. Several beaches in Thanet, including some with blue flags for high water quality, were closed for nine days because of concerns for public health. Debris, including wet wipes, sanitary products and condoms littered the coastline.

The same beaches were later closed on several occasions because of similar failures at the water company's pumping station at Margate, which was unable to cope with heavy rain.

At Maidstone Crown Court, Southern Water pleaded guilty to two unauthorised releases of untreated sewage in June 2012 and asked for two offences in 2014 to be taken in consideration.

The court heard that Southern Water spent £350,000 on a clear-up of affected beaches and paid £36,700 in compensation to local businesses. Southern Water suggested that its customers were partly to blame, saying that its pumps had been blocked by un-flushable items. It also said that it had revised its procedures and was now able to report emergencies more rapidly.

Ofwat warns water companies

In January 2017, Ofwat, the water regulator, warned companies to behave properly and not let down unsuspecting customers when the supply market to business and public sector estates is opened to competition on 1st April. From then, businesses and organisations particularly those with multiple sites around the country, will be able to choose one nationwide water supplier. Numerous non-domestic customers will automatically change supplier as some regional monopolies have already sold their business and council customer lists to third parties. However, as the water industry becomes what is the largest competitive market in the world, with businesses of up to 1.2 million companies, Ofwat has warned that it will clamp down on any misconduct.

Healthy water, healthy workers at IBM's Hursley R&D facility

IBM's Hursley facility in Hampshire, UK, has launched a state of the art water analysis initiative that will allow it to pro-actively address health mandates and protect the on-site staff.

The project will:

- Improve the quality of monitoring data
- Reduce the time and cost of manual processes
- Minimize health risks to employees

The facility is one of the largest software development sites in the world, with more than 2,000 employees on site daily. It is also a registered historic landmark campus.

To comply with Legionella testing requirements, a staff member would previously walk the entire site with a thermometer, testing water outlets, taps and showers to ensure that its water was within the acceptable temperature range. This was a full day's work that sampled only a small proportion of water in actual usage. Results of the testing were recorded manually in a paper based log. There was no further use of the data past this point and no trend or location based analytics were applied. To improve proactive monitoring of the water supply and protect the well-being of workers, IBM is working with CBRE who provide facilities management for the Hursley campus and with SPICA Technologies for an innovative Internet of Things solution. SPICA's devicepoint for Healthy Water solution is a facility management tool for monitoring a water supply with precision. It is non-intrusive to the water system and overall building. This feature is ideal given the historic status of the Hursley site. SPICA devicepoint sensors operate for up to eight years on a single battery, and utilise an Ultra-Narrowband radio frequency allowing penetration through walls and floors with ease. The sensors can be simply connected directly onto the water pipes that need to be monitored, taking just a few minutes to install.

The healthy water solution is deployed in three phases: sensors collect raw data and send it to the devicepoint cloud application, analytics and trend identification are performed, and visual reporting is delivered. SPICA devicepoint cloud application services are provided on a monthly subscription basis. These support real-time data analytics and event alerts which make a foundation for well-structured health risk management. With the SPICA Healthy Water solution, data from pipes can now be assessed continually against optimum temperature conditions and engineers are notified immediately when issues are found. From a solution compliance perspective the data needs to be validated, and every devicepoint sensor comes with a certification of calibration for quality assurance.



Vexo International (UK) Ltd strengthens its team

A company spokesperson has revealed that 'to keep pace with its continued growth and range of Water Treatment Products & Chemicals, Vexo is very pleased indeed to welcome on board Matthew Skinner as Business Development Manager for the London & SE region.



'Matt joined Vexo from Flamco UK Limited where he was Regional Sales Manager and prior to that Technical Sales Engineer at Witt Gas Techniques. Matt has a wealth of both technical and sales experience and using these skills will continue to work closely with BSS Industrial, Vexo's national distributor in addition to MEP Design Consultants & Contractors, FM Specialists, Developers and end user clients.'

Sentinel Commercial team continues to grow

Sentinel Commercial, the water treatment specialist has welcomed yet another area manager to its team in order to cope with rising demand. The appointment follows shortly on from two new area managers in 2016.

Russ Walliss has taken on the role of Commercial Sector Manager for the South, and is responsible for providing technical sales services to meet the individual needs of a range of commercial clients including specifiers, local authorities, healthcare providers and design and build contractors.



A spokesperson stated that 'Russ will be a familiar face to many in the heating industry, having occupied senior roles in the sector for more than 35 years, including Area Sales and Support Services Management positions with Hamworthy Heating, as well as Mechanical Package and Contracts Manager for Colt International.' Specifically, Russ will form value propositions for end-user clients, liaise with boiler and component manufacturers to ensure end-to-end solutions, and work alongside consulting engineers and contractors to provide specification and onsite advice. He will also deliver best practice training via CPD seminars.'

Further information available at: www.sentinelprotects.com

Expensive 'alkaline' water

'blk premium alkaline water' is a soot-coloured drink that claims to contain trace fulvic minerals and (strangely) to have a pH of 8.0+. Also, remarkable is the price of £4.40 a litre.

Further information available at: www.getblk.co.uk



Surplus power from wastewater and sewage

The Marselisborg Wastewater Treatment Plant in Aarhus, Denmark, has been substantially modified.

The improvements mean that it can produce more than 150 per cent of the electricity required to operate the plant. The surplus is being used to pump potable water around the city. Furthermore, in addition to powering the entire water system for the 200,000 people living in the inner city area, excess electricity can be sold to the grid.

The plant generates electricity using, as fuel, the biogas obtained during the treatment of household wastewater and sewage. Carbon is extracted and pumped into digesters that are maintained at 38°C and filled with bacteria. These produce biogas, mostly methane, which is burned to make both heat and electricity.

The improvements to the treatment plant required an investment of almost £3 million, but it is expected that this will be recouped in only five years.

Further information available at: www.aarhusvand.dk/international

Graphene sieve turns seawater into drinking water

New research demonstrates the potential of providing clean water sources, using graphene-oxide membranes.

The findings from a group of scientists at The University of Manchester were published on the 3rd April in the journal *Nature Nanotechnology*.

Previous research at The University of Manchester found that if immersed in water, graphene-oxide membranes become slightly swollen and smaller salts flow through the membrane along with water, but larger ions or molecules are blocked.

The Manchester-based group have now further developed these graphene membranes and found a strategy to avoid the swelling of the membrane when exposed to water. The pore size in the membrane can be precisely controlled which can sieve common salts out of salty water and make it safe to drink.

When the common salts are dissolved in water, they always form a 'shell' of water molecules around the salts molecules. This allows the tiny capillaries of the graphene-oxide membranes to block the salt from flowing along with the water. Water molecules are able to pass through the membrane barrier.

Mr. Jijo Abraham and Dr. Vasu Siddeswara Kalangi were the joint-lead authors on the research paper: "The developed membranes are not only useful for desalination, but the atomic scale tunability of the pore size also opens new opportunity to fabricate membranes with on-demand filtration capable of filtering out ions according to their sizes." said Mr. Abraham.

It is hoped that graphene-oxide membrane systems can be built on smaller scales making this technology accessible to countries which do not have the financial infrastructure to fund large plants without compromising the yield of fresh water produced.

Hot water safety and infection control

Bristan is offering its Opac bar shower with incorporated TMV 3 control, for use in a commercial environment.

With many employees now cycling to work, showers are not only considered the most important workplace facility, but are also a factor when looking for a new job.

When specifying for such facilities the obvious safety considerations are hot water scalding and legionella. A high water temperature must be maintained and the risks of hot water must be balanced with infection control.

An effective way of achieving this is to specify products with an inbuilt TMV, or ancillary TMV. Such valves allow the water to be distributed at high temperature, but reduced to a safe temperature at the point of use. Moreover TMVs can maintain the desired temperature even when the incoming water pressure/flow rates change and will automatically shut off in the event of a hot or cold water supply failure. The recommendation is to use TMV 3 fittings for optimum safety.

The Opac bar shower features separate control for temperature and flow with lever handles. It is fully 'cool touch' as it can never get hotter than the mixed water temperature. Also featured is an integrated isolation and hot water flush mechanism, making infection control quick and easy.

Further information: www.bristan.com

Microbe testing: temperature and humidity data logging

Test equipment specialist Testo has supplied its Saveris 2 temperature and humidity data logging system to Stansted Laboratories' facility in Barking, East London. Stansted Laboratories is a UKAS accredited laboratory analysing over 50,000 samples a year. It specialises in microbiological analysis of water and air, and especially Legionella testing of water, and drinking water bacteriological analysis. Maintaining precise temperatures within its devices and cold room is essential to ensure accuracy and for compliance with UKAS requirements, as is maintaining a detailed record. This process was being carried out manually, but as the company grew this became a time-consuming, labour intensive activity. Testo recommended its Saveris 2 system, which is specifically designed for small to medium-sized applications. The entire system is automated, needs no maintenance except for annual recalibration, staff do not require training, and it is easily expandable and simple to install.

STW make National Water Hygiene 'blue card' mandatory

Severn Trent Water (STW) has made an executive decision to mandate that all those who work directly in contact with drinking water should hold a National Water Hygiene 'blue card' and has then gone one important step further, also making them obligatory for its non-operational staff, including its Chief Executive and senior management team. Martin Kane, Chief Engineer of Severn Trent plc explains: "We believe it is essential that our non-operational staff also understand the causes of water quality issues and what best practice looks like. We like to start at the top, so all of our Executive team are 'blue card' holders." The National Water Hygiene training and accreditation scheme was introduced a decade ago as a collaboration between the UK water industry, key public health bodies and Energy & Utility Skills Group (EU Skills). Nick Ellins, Chief Executive of EU Skills, said "It is important for anyone working in contact with the water supply – contractors, environmental health practitioners, building maintenance companies, local authorities and plumbers – to embed this excellence in their operating practice."

Further information: www.eusr.co.uk

'Wet Elephant' tidal energy scheme

In December 2016 an £18 million tidal energy scheme was ridiculed as a 'wet elephant' when it stopped working after only three months. The DeltaStream project, which was partly funded by the taxpayers, was supposed to power 600 homes using the ebb and flow of the ocean to drive a 39ft turbine installed on the seabed close to Ramsey Island. Unfortunately the system developed a fault and ceased to generate electricity. Its operator, Tidal Energy Ltd, has now gone into administration and is seeking a buyer. The project needed £8 million of EU funding and £500,000 from the Welsh government. The generator was fitted with sonar to detect nearby wildlife, including seals and dolphins, shutting off the turbine if they came too close. However, the sonar developed an "intermittent fault" in March 2016 after being introduced in December 2015. Chris Williams, development director at Tidal Energy Ltd defended the cost of the DeltaStream, saying that it was a 'research project', aimed at providing knowledge and experience to develop the technology in Wales. A Welsh government spokeswoman said that a buyer was being sought.

Fulton launches all new steam boiler

Fulton has launched its SRT Series steam boiler at ISH, Frankfurt. "Fulton's all-new SRT Series is the most radical change to vertical steam boiler design since the company pioneered the vertical tubeless boiler in 1949," says Carl Knight, Managing Director. By adopting a system engineering approach to design, and using its own 'PURE' technology, Fulton's SRT Series challenges the traditional heat transfer and mechanical design principles of vertical steam boilers. The SRT boasts industry-leading performance with an 84.5% Gross (93.5% Net) thermal efficiency and 99.5% steam quality from a fully water-backed design with no refractory.

With over 30 worldwide patents pending, the new vertical boiler's spiral-rib tubeless design is a world first that has enabled Fulton to create a compact boiler with the industry's smallest footprint. In fact, compared to the equivalent 30hp model from the company's renowned J Series, the SRT Series is an impressive 40% smaller.

The SRT is CE marked and complies with anticipated EU regulations, with the boiler's combustion technology being completely reconfigured, with the mesh burner and furnace designed as a single component, resulting in ultra-low NOx emissions of less than 40mg/kWh.

Further information: www.fulton.co.uk



Rural project improves river health

Started in 2014, the Northumberland Rural Diffuse Pollution Prevention Partnership (NRDPP) project now involves the Environment Agency, Tees River Trust, Forestry Commission, private firm EGGAR Forestry and numerous farmers. Last year the partnership installed features such as large upstream silt traps and log dams in commercial forestry areas in the River Leven, a tributary of the River Tees, to improve the ecology of the watercourses. The River Leven is currently failing Water Framework Directive assessment criteria due to silt linked to land management practices. According to the Environment Agency, excessive silt in the water can smother fish eggs and have a negative effect on macroinvertebrate and aquatic plant populations.

Iron hydroxide coatings decontaminate water

An iron hydroxide nanoparticle coating developed at A*STAR's Institute of Materials Research & Engineering in Singapore can allegedly remove pollutants like dyes and heavy metals from drinking water.

Iron hydroxides, found in rust, are known to form stable chemical bonds with such pollutants and nanoparticles are particularly effective. However, nanoparticles pose a risk to human health, and removing them from water is difficult. The team from A*STAR decided to immobilise iron hydroxide nanoparticles on a solid substrate for easy removal. They used nickel foam as the substrate. Iron nanoparticles were deposited onto the surface using electrodeposition, in which the nickel foam is immersed in a solution of the nanoparticles, and a small voltage is applied. Testing using a Congo Red dye showed that the coating removed more than 90% of the dye within 30 minutes, at room temperature. Scanning electron microscopy showed long, "fin-like" protrusions from the surface of the coating, which scientists believe is responsible for the efficacy of the coating.

More Information: *Journal of Materials Chemistry A* doi.org/bxsz

Huge oil spills in Bodo not yet cleaned up

In January 2015, Royal Dutch Shell agreed to pay £55 million in compensation to thousands of residents of Bodo, Nigeria, a fishing community in the Niger Delta. Their livelihoods had been devastated by two oil spills in 2008-2009 that had been caused by corroded pipelines. The settlement was supposed to pave the way for the oil blighting the village to be cleaned up, but oil still laps on the shoreline of its creeks. Shell insists that some preliminary work did take place soon after the spills and that the original damage has been compounded by oil from theft and illegal refining. The company also argues that it has been unable to get the community's backing to access the site safely and conduct a proper clean-up.





Suez buys GE's water business

French waste and water group Suez said in a statement it and Canada's Caisse de dépôt et placement du Québec (CDPQ) have agreed to buy GE Water from General Electric for €3.2 billion (\$3.37 billion).

Suez and CDPQ will set up a 70/30 joint venture to buy 100 percent of GE Water in an all-cash transaction, after which Suez will contribute its existing industrial water activities to the new Industrial Water business unit.

The cash transaction is expected to close by mid-2017 but the acquisition raises the question of how SUEZ is going to integrate two sizeable industrial water businesses - including 7,500 GE employees and its own - spread around the globe.

GE Water generated \$2.1 billion in revenue in 2016 from the industrial water treatment market, estimated to be worth €95 billion with 5% growth annually.

Confirming the acquisition, Suez CEO Jean-Louis Chaussade said: "I am very proud to announce the acquisition of GE Water, which will accelerate the implementation of SUEZ' strategy by strengthening its position in the promising and fast-growing industrial water market. This combination will create further value for both our employees, clients and shareholders."

Michael Sabia, president and CEO at CDPQ, said: "Operating in a core industry, GE Water has built a premier business with recurring revenues and a high-quality and diversified customer base. This investment is therefore highly aligned with CDPQ's long-term vision and its strategy of increasing its emphasis on stable assets anchored in the real economy, alongside key operators such as SUEZ."

Simplified water temperature testing kit

Now available from Martindale Electric is its new Legionella testing thermometer kit, which quickly and reliably tests and monitors water temperature and conditions that can favour the growth of Legionella and other harmful bacteria.

As water temperature is a key factor, the new ThermokitLGN Legionella testing thermometer kit can be used to monitor and test the temperature of both standing water and the surface of pipes and tanks that form part of a water system. The kit includes a DT73 thermometer with maximum function and two robust surface and immersion probes.

Lightweight and complete with a soft carry case, the ThermokitLGN is said to contain everything you need to comply with recent legislation, which states that all employers who manage premises with hot/cold water systems and/or wet cooling systems have a legal responsibility to identify any risk of contamination and to prevent or control it. The DT73 thermometer is supplied in Martindale's tough yellow holster, to withstand on-site conditions and provide many years of service.

Further information available at: www.martindale-electric.co.uk



Adelaide - Legionnaires' disease outbreak

Hundreds of air conditioning units and cooling towers across buildings in Adelaide's CBD and inner-city suburbs were checked in January 2017, after a spate of Legionnaires' disease cases were reported. South Australia Health's acting chief public health officer Dr Ken Buckett said that as at the 24th January eight people had contracted the disease linked to this cluster, seven of whom had visited the CBD between December 27th and January 11th, but no single common location had been identified as the source of the outbreak.

Dr Buckett said the disease was contracted by breathing in bacteria, which may have been released from air conditioning cooling towers. "We think it may have something to do with the strange weather we've been having," he said. "It's going from very hot to pretty mild, which means that air conditioners are being put under a heavy load, in a stop and start regime."

Dutch scientists discover favourable conditions for growth of Legionella bacteria

The bacteria that cause Legionnaire's disease grow well in warm tap water installations with ample dissolved organic matter-conditions that support the growth of biofilms. The research was published on January 6th in *Applied and Environmental Microbiology*, a journal of the American Society for Microbiology.

The team of Dutch scientists conducting the research was motivated by large outbreaks of Legionnaires' disease to find out what conditions favoured growth of the responsible bacterium, *Legionella pneumophila*, on surfaces exposed to drinking water, said first author Dick van der Kooij, PhD, recently retired as Principal Microbiologist at KWR Watercycle Research Institute, Nieuwegein, the Netherlands, where this research was conducted.

The scientists developed a model system that enabled measurement of biofilm formation and growth of *Legionella* exposed to drinking water without disinfectant, under controlled hydraulic conditions. They used this system to compare a water supply system with a very low concentration of dissolved organic matter with a water supply with a high concentration.

"Drinking water prepared from aerobic groundwater with a low concentration of dissolved natural organic matter induced a very low biofilm concentration that did not support growth of *L. pneumophila*," said van der Kooij. "Drinking water from two other sources with higher concentrations of organic matter induced higher biofilm concentrations that supported *Legionella* growth."

Legionella bacteria grew exponentially in relation to biofilm concentration, said van der Kooij. Below a threshold concentration of biofilm, *Legionella* did not multiply.

"Our research demonstrated that µg/l concentrations of biodegradable compounds in warm drinking water can induce sufficient bacterial growth on surfaces for proliferation of the amoebae that support growth of *Legionella*," said van der Kooij. "Heating the water increases the concentration of biodegradable compounds, thereby promoting biofilm formation."

Young biofilms support a high concentration of bacterial species that serve as prey for amoebae, and the latter, in turn, serve as hosts for *L. pneumophila*, said van der Kooij. The amoebae are important because they supply amino acids required by the *Legionella*.

Clearwater growth drives move to new Bishops Stortford office

Clearwater Technology provides services covering all aspects of water treatment and hygiene, engineering, consultancy and air hygiene. With a network of offices strategically located across the UK and Ireland, due to industry demand the company has recently opened a larger office and storage facility in Raynham Road Industrial Estate, Bishops Stortford. Five years ago, Clearwater Technology moved one of its satellite offices in Colchester to an office and warehouse facility at Stort Valley Industrial Estate in Bishops Stortford, where they set up a Regional office. It set about helping its local customers meet the ever demanding pressure of water, energy and carbon foot print reductions, therefore, enabling them to achieve greater return on investment and providing a competitive advantage.

'Whether its peace of mind for compliance issues around Legionella, control schemes, primary and secondary control systems like chlorine dioxide or treatment of borehole or incoming water supplies, we have a solution.' Gary Sewell, Eng. MWMSoc. (General Manager, Bishops Stortford office).

Further information: www.clearwater.eu.com



Severn Trent shakes off rebellion against Dee Water takeover

A bitter shareholder rebellion against Severn Trent's planned takeover of Dee Water has been quashed by a High Court ruling in favour of the £84m tie-up.

The court ruled against an unprecedented coup by a large group of activist shareholders who hoped to block Dee Water's shareholder vote on the Severn Trent deal over concerns that change in ownership would bring job cuts and water bill hikes.

The FTSE 100 water giant's plans were almost scuppered by an employee of Dee Valley who paid £8,000 for 450 shares which he gave out to community members so they could vote against the deal. The newly enfranchised shareholders were able to challenge the deal because it required a dual shareholder majority in terms of both value and individual shareholder numbers. The vote revealed 93pc in favour by value, while only 44pc of individual shareholders supported the plans.

Severn Trent boss Liv Garfield said the water giant is "pleased with the decision handed down" by the high court.

The court backed the decision of Dee Valley chairman Jon Schofield to disregard the flurry of questionable shareholder votes in a ruling which could set a precedent which upholds the discretion of company chairs in future shareholder disputes. The Dee Valley board is poised to move ahead with the takeover after the activists appeared to concede and are unlikely to appeal the ruling.

NEW members 2017

The WMSoc welcomes new members:

Paul Abbott	Martin King
Valentino Aliffi	Jason Lee
Kirby Austin	Tim Lonergan
Christopher Baker	Louis Ludlow
John Barrett	Shane Lynch
Danielle Bayliss	Ian Mason
Mark Bellinger	Ryan McCreanor
Craig Beswick	Jim McGuigan
Robert Blake	William McVeigh
John Boldan	Simon Munford
Warren Bradshaw	Barry O'Neill
Robert Brown	Paul O'Brien
Andrew Casey	Kevin Pace
Ian Coltman	Paul Pearce
David Cox	Peter Perrin
John Devenny	Allan Pitt
Claude Digiaro	Doug Pratley
Paul Drakeley	Lee Roome
Ian Edwards	Paul Rose
Paul Farrell	Luke Skinner
Craig Freestone	Joseph Sloan
Ailsa Gardiner	Duncan Smith
James Gomm	Matthew Soave
Peter Griffin	Jamie Swan
Michael Haines	Mark Taroni
James Hammond	Chris Upex
Christopher Hansen	Steven Van De Peer
Jamie Harper	Jacob Varghese
Gavin Hartley	Tim Wafer
Steven Harvie	Dominic Wall
Mary Henderson	John Warren
Mark Higgins	Thomas Warrender
Mark Hill	Stephen Whitbread
Barry Holohan	Leigh Whitehouse
Paul Jarman	Paul Woodroffe
Bernard Jones	Louis Wyborn
Ryan Jones	Adam Young
Stuart Kent	

The Authorising Engineer (Water) Past, Present and Future?

Steve Mount 
BSc(hons) CBiol MRSB MIHEEM MWMSoc IHEEM Registered Authorising Engineer (Water)

Origins:

The Authorising Engineer (AE) for Medical Gas Pipeline Services (MGPS) role was introduced in Scotland over 40 years ago, based on a decision to investigate the problems being experienced by the five Regional Boards making up the NHS in Scotland, prior to the introduction of a national code of practice, HTM 22, in 1972. Similar arrangements for Electrical Authorising Engineers were put in place in England by the Regional Health Authorities. More recently the AE (Water) has been used by healthcare organisations, corporate landlords, multi-site property holders and facilities management specialists to improve corporate risk management, compliance and reduce risk.

What is an Authorising Engineer (AE)?

The Oxford English Dictionary defines "Authorising" as: "Giving official permission for or approval to (an undertaking or agent)."

"Engineer" is defined as: "A person qualified in a branch of engineering, especially as a professional."

"Engineering" is defined as: "A field of study or activity concerned with modification or development in a particular area."

So from these definitions an AE should be a qualified professional person who gives advice or suggestions for an activity concerned with modification or development in a particular area.

An AE should act as an independent and impartial professional adviser to an organisation and should be appointed with a brief to provide services in accordance with the relevant guidance and legislation. This will provide the client with benefits including:

- A potential reduction in Corporate Risk by a review and improvement of management processes
- Detailed knowledge of all relevant statutory compliance issues
- Assist organisations improve compliance levels and provide assurance to their Boards
- Independent, impartial advice
- Assessment of key personnel who undertake key responsibilities as defined in legislation,

Approved Codes of Practice and make recommendations to appoint or re-appoint

- A potential to reduce construction costs by advising at the design and new build construction phase

An AE (Water) will additionally provide:

- Specialist knowledge of small and large scale water systems
- Knowledge of infection prevention and control procedures and how these impact water service design and maintenance
- Impartial audit of water risk assessments carried out by third party assessors
- Advice on potential efficiency savings on water usage

In order to fulfil the role it is clear that the professional person must have expert knowledge and experience in their field and be independent and impartial using the available current guidance and legislation in order to carry out their role. This poses some questions:

- What is an acceptable level of experience and how is this evaluated?
- What qualifications and training should AEs' have?
- Should all AEs be independent consultants or organisations with no ties to companies selling products or services that may be required to carry out recommended remedial works i.e. a potential conflict of interest?
- Who regulates their approval to operate and how is this assessed?

The Present position

The Government recognises AEs' in both the Ministry of Defence and Healthcare, the latter via the Department of Health in both their Health Technical Memorandum (HTM) 00 "Policies and principles of healthcare engineering" 2014 and HTM 04-01 "Safe water in healthcare premises – Parts A-C" 2016.

The professional membership body that currently provides assessment and approval of AEs, in Healthcare, is the Institute of Healthcare

Why did you become a member of the Water Management Society?

"I would like to gain further guidance and direction on the control of legionella as well as the likes of pseudomonas from leading experts. The WMSoc is key in highlighting new initiatives and methods within this sector. Furthermore I would like to be kept up to date with conferences and seminars. Overall I believe that membership would aid me in my role and help develop me further for the future."

"Professional development, engagement & networking with other WT and environmental service colleagues."



Engineering and Estate Management (IHEEM). They currently have four Authorising Engineer registers, each with their own registration board, covering:

- Decontamination
- Medical Gas Pipeline Systems
- Electrical
- Water

The AE (Water) register was established in October 2015, the purpose of which is to establish a record of suitably qualified and experienced professionals for the healthcare community, and who will undertake peer reviews to assess candidates applying to join the register. A list of application criteria are shown in Table 1. All registrants will be reviewed by the registration panel every three years and must submit to the AE (W) panel registration sub-group the information detailed in Table 2.

Currently, anyone can call themselves an AE as there are neither legal requirements nor mandatory qualifications required to allow someone to operate as an AE, nor any required standard for potential clients to use in order to gauge competency. Therefore a commercial company can market their staff as AEs and the client has no reference point to decide on their capability. The water industry is offering services designed to help clients comply with their statutory obligations and most importantly keep people safe from potentially fatal infections from building water systems and as such, such self-regulation should be frowned upon. There are numerous such self-proclaimed AEs working in both the healthcare and non-healthcare sectors who are not regulated or registered, with varying degrees of competence and experience. The increased level of risk especially associated with healthcare premises and patients is of concern.

Professions surrounding healthcare such as Biomedical scientists, Paramedics and Radiographers are required to register with the Health and Care Professions Council (HCPC). The HCPC are regulators and have strict standards of conduct, performance and ethics. Each individual is required to self-certify against a long check-list of skills and is required to keep their Continuing Professional Records (CPD) up-to-date. This is performed on a bi-annual basis and the HCPC can request evidence at any time. Anyone can search for an individual's registration and they can be "struck-off" if they are found not to comply. There is currently no equivalent for those working with domestic water distribution systems, although WaterSafe is working towards enhanced standards for plumbers.

The Future?

There are no regulators similar to HCPC in this field. The IHEEM register focuses on the healthcare environment but the registration and monitoring process could usefully be transferred to other sectors. The water treatment industry needs a recognised, reputable, industry body to be created or step in to standardise, approve and audit people to work as AEs in the field for the non-healthcare market. One could argue that this could be taken on by IHEEM, perhaps in collaboration with the Legionella Control Association (LCA) and/or United Kingdom Accreditation Service (UKAS).

The LCA have over 300 member organisations and utilise a programme of company audits by a team of LCA assessors to assess the capability of member organisations to provide services and products concerned with the control of Legionella bacteria in water systems, however, many of these deliver multiple services and therefore cannot be considered truly independent. There is a category for Consultants, however, so could the LCA include an individual registration process for AEs alongside their current registration and auditing procedures as laid out in the LCA Code of Conduct for Service Providers?

Currently, UKAS accredit and audit some companies for Legionella risk assessments. Typically the auditor would assess each risk assessor on a one to one basis during their annual one day audit but if an organisation has multiple risk-assessors this may take multiple years of visits before all staff are assessed. The "Hawthorne" effect, a form of reactivity in which subjects modify an aspect of their behaviour, in response to their knowing that they are being studied, is common in this type of activity and is especially relevant in Healthcare (with respect to handwashing for example).

In an ideal world the AE (W) accreditation/approval body could carry out a physical audit of work in practice to assess individual competency rather than just administering an annual paperwork based exercise. Why not keep everyone focussed by utilising unannounced audit and inspection visits, such as the CQC can do in healthcare? This would provide a more realistic insight for the auditor to identify what is really going on. Surely a stricter level of competence, conduct and experience is required and perhaps to become fully regulated in the future?

In order for this industry to progress we need to produce more reliable, high quality systems with better skilled staff for the supply of water safety services, including the provision of Authorising Engineers for water. A rethink or expansion of more stringent regulation, improvements in training and a clamp down on poor service providers, in my opinion, is a must going forward.

Table 1 - All IHEEM AE (Water) registrants must:

a. Have a minimum of 10 years recent relevant water systems experience in one or more of the following areas: i. Operational Management ii. Risk Assessment iii. Design of Water Systems iv. Project Management v. Water Quality / Treatment vi. Statutory Enforcement vii. Other related Water Quality / Safety experience
b. Have extensive auditing experience
c. Have experience of providing independent advice
d. Have successfully completed a recognised course for Responsible Person (Water) in the last 3 years
e. Demonstrate understanding of water sampling testing and analytical results
f. Submit a Practice Report of approximately 2000 words + appendices outlining the experience and type of work carried out. The Practice Report should address the criteria above
g. Submit a separate CPD log
h. Be a member of IHEEM at Member or Fellow level
i. Undertake a successful Professional Review and interview by AE(Water) Panel
j. Agree by signature to adhere to AE(Water) Code of Conduct
k. Agree by signature to be independent and impartial
l. Complete an HTM00 AE Foundation Course within 12 months of registration, if not already completed.

Table 2 - To re-register with IHEEM the AE (Water) is obliged to provide:

a) Documentary evidence or a CPD log showing a minimum of 30 hours of CPD annually.
b) A written professional review of the registrant's activity summarising the period since last registration. The review should be approximately 2000 words.
c) Collectively, these documents should adequately demonstrate: i. awareness and application of current water standards and practices. ii. ongoing development of knowledge and skills iii. routine decision making and accountability in the field of water.

"My reason for joining was to initially keep up with legislation, I now feel the need to stay a member to enhance my knowledge of water treatment and hygiene and also associate my name with a reputable organisation."

"I take great pride in my job and feel proud to be part of this industry. I really enjoyed the WMSoc training course I have been on and I want to be as good at my job as I possibly can. To access information I find the quarterly journal very informative. It covers developments in the industry that I otherwise may miss out on."

"Professional development and to gain more knowledge and understanding of water management and to connect with other professionals."

INDUSTRY UPDATES

CSCA News

The CSCA, formally established in June 2016, is a non-profit membership organisation for companies who actively support and demonstrate a sound approach to the control of water quality in closed systems. Recommendations contained in **BSRIA AG 2/93** - Water Treatment for Building Services Systems, **BSRIA BG 29/2012** - Pre-Commission Cleaning of Pipework Systems, **BS 8552:2012** - Sampling and monitoring of water from building services closed systems code of practice and **BSRIA BG 50/2013** Water Treatment for Closed Heating and Cooling Systems have been used by the CSCA to assist in drawing up the CSCA scheme.

Benefits of Closed System Control Association to FM companies is the robust auditing of suppliers leading to reduced fouling and corrosion issues. The benefit of joining the CSCA as a registered member for WTSPs/Cleaning Companies is independent verification of high management standards.

If you are interested in joining the CSCA as a service provider and commit to the CSCA Code of Practice and the CSCA Service Standards, please go to: www.cscassociation.org.uk/downloads.html to view the registration procedure and documents.

If you are interested in joining the CSCA as a Sponsor or Founder member, contact admin@cscassociation.org.uk. Founder members and sponsor members are companies that are involved in closed systems but are not necessarily service providers e.g. Independent consultants, Chemical manufacturers/blenders and Test kit manufacturers. CSCA do not endorse Founder members' products and services. www.cscassociation.org.uk

PWTAG News

The new PWTAG website is now live with Swimming Pool Water book orders and membership & Poolmark applications welcome via the website. Code of Practice and other PWTAG technical documents are available to download on the website as well as informative videos and links. Members of the PWTAG Executive group, Janice Calvert (Chair of PWTAG), Howard Gosling, John Lee and Susanne Lee are giving presentations at the International Swimming Pool Conference held in Kos on 2-5 May 2017. www.pwtag.org.uk



Legionella Control Association News

Legionella Control Association are holding their annual LCA Training Day on 11th May 2017.

Speakers include Toby Thorp, EHO – City of London and John Newbold, LCA Assessor. The event is open to everybody and discounted places are available to LCA members only.



Annual re-registration for LCA members is on 1 July 2017 when LCA members send in their annual internal audit form and their reviewed Statement of Compliance. The detail on the Statement of Compliance confirms to the LCA Management Committee that members' operations fulfil the Service Provider Commitments of the LCA Code of Conduct that are applicable to their business.



THE WATER MANAGEMENT SOCIETY

City & Guilds accredited training

Temperature Monitoring, Sampling and Inspection of Water Systems for Technicians

For those who carry out temperature monitoring and control of water systems, e.g. technicians, building caretakers and operators. Also beneficial to supervisors and responsible persons who have little knowledge of how the work is done or why it is necessary.

OBJECTIVES: To explain the reasons why systems need to be monitored and controlled. Also, to give practical instruction and guidance in temperature monitoring, sampling and inspection of hot and cold water services in buildings.

TOPICS COVERED:

- **LEGIONELLA AWARENESS, MICROBIOLOGY AND ORIGINS OF LEGIONELLA.**
- **ASSOCIATED LEGISLATION AND REGULATION REQUIREMENTS.**
- **MONITORING REQUIREMENTS OF 'OTHER SYSTEMS'.**
- **TANK INSPECTION AND MANAGEMENT OF 'VOID' PROPERTIES ARE ALSO INCLUDED.**

INCLUDES INSTRUCTION IN THE PRACTICAL TRAINING AREA



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event report

SPATEX 2017, The Pool, Spa & Wellness Show 31st January – 2nd February 2017

Water Management Society exhibited at Spatex 2017, on a contra-deal basis, which welcomed 1,360 visitors over 3 days. Many visitors to the WMSoc stand were interested in the Legionella risk assessment training and the technical guidance documents available to WMSoc members. Visit www.spatex.co.uk for more information.



HSG282 Spa Pools

Control of Legionella and other infectious agents in spa-pools was published in January 2017 and updated in April 2017 by HSE. The document is available to download from the HSE website: www.hse.gov.uk/pubns/books/hsg282.htm



L.E.A.P

The L.E.A.P event was set up in 2013 to bring together like minded individuals passionate about water quality to share ideas, solutions and strategies about Legionella, Pseudomonas and Water Quality.

L.E.A.P (Legionella and Environmental Action Platform) Legionella and Pseudomonas control event

Wednesday 21 June 2017, SCI, London

2017 brings the 4th L.E.A.P event that will be held on Wednesday 21st June at The Society of Chemical Industry (SCI) Headquarters in Belgravia (www.soci.org/meeting-rooms/auditorium).

L.E.A.P. 4 has evolved to a central London location at SCI which offers a fantastic set up and we're confident the guests will find it to be another great event. The auditorium set up will enable us to share more information and annual L.E.A.P. attendees can be confident that the speakers will be available throughout the day with ample Q&A and access available.

The 2017 event will remain true to its source as a water quality event aimed at Legionella and Pseudomonas control. CPD points and certificates are available for the one day L.E.A.P. 4 event covering waterborne pathogens.

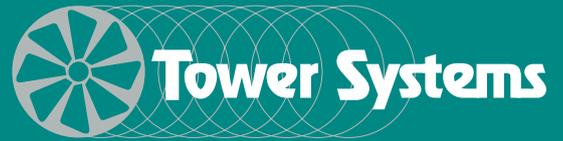
The L.E.A.P 4 Event is now open for bookings. If water quality is a subject that you're interested in, why not come and join us? We're confident you'll find the speakers informative, have ideas to consider and a good networking opportunity with other like minded delegates.

Water Hygiene
events

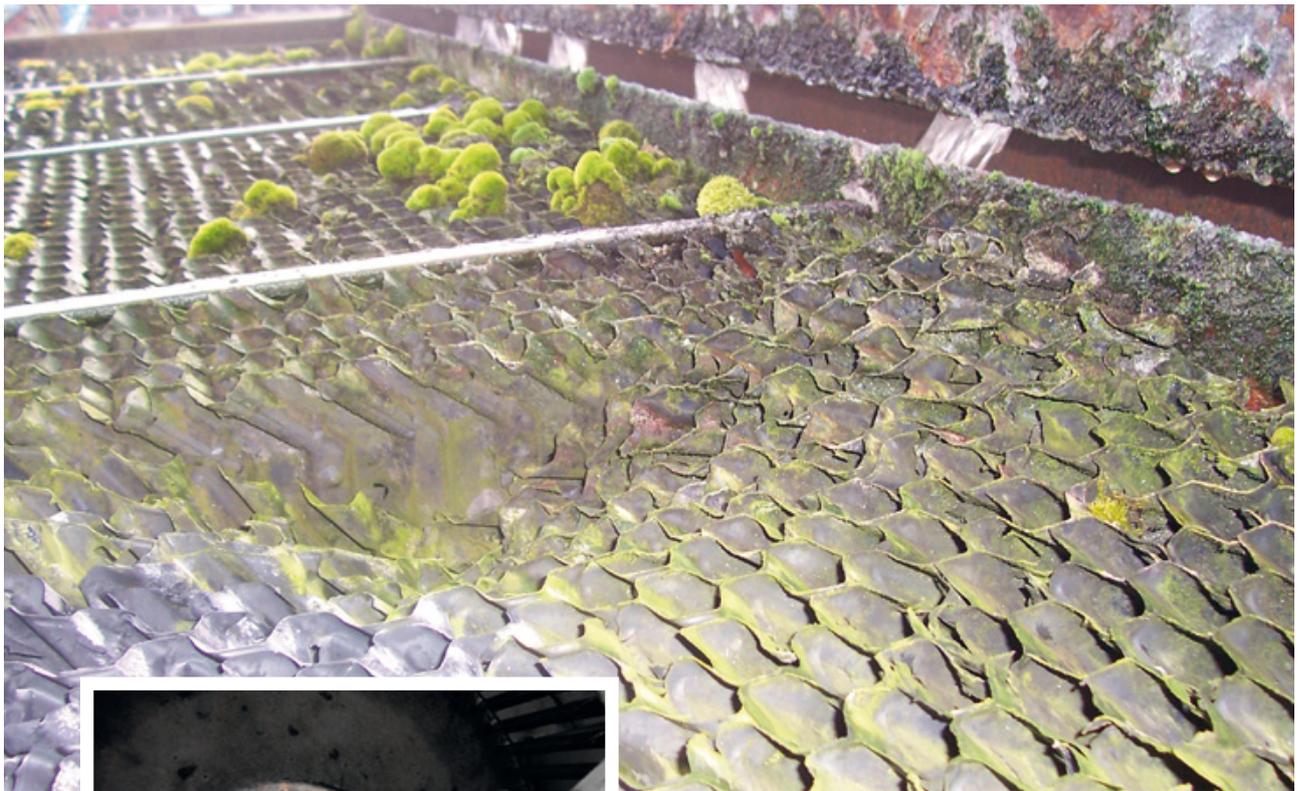
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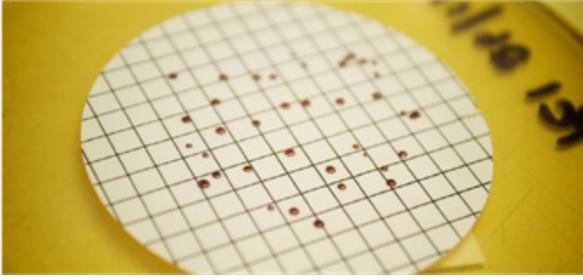
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WINTER PROGRAMME 2017

Wednesday 8th February	Cleaning and Disinfection ●
Tuesday 14th February	Landlords and Letting Agents Legionella Risk Assessment Training ●
Wednesday 15th February	Legionella Training for Dutyholders and Responsible Persons incorporating L8 ●
Tuesday 21st February	Practical Legionella Risk Assessment** ●
Tuesday 7th March	HTM 04-01 Water Hygiene Training ●
Tuesday 14th March	Basic Legionella Risk Assessment of Water Systems
Wednesday 15th March	Foundation Course in Water Treatment Chemistry ●
Tuesday 21st March	Cooling and Boiler Water Chemistry - PART 1 ●

WHERE INDICATED ● COURSES USE WMSoc's PRACTICAL TRAINING AREA

SPRING / SUMMER PROGRAMME 2017

Tuesday 4th April	Practical Legionella Risk Assessment** ●
Wednesday 5th April	Temperature Monitoring, Sampling and Inspection of Water Systems for Technicians ●
Tuesday 25th April	Boiler Water Chemistry (follow on)* ●
Wednesday 26th April	Cooling Water Chemistry (follow on)* ●
Tuesday 2nd May	Management and Control of Closed Systems ●
Wednesday 3rd May	Practical Legionella Risk Assessment** ●
Tuesday 9th May	Legionella Training for Dutyholders and Responsible Persons incorporating L8 ●
Wednesday 10th May	Legionella Risk Assessment in Cooling Systems ●
Tuesday 16th May	Landlords and Letting Agents Legionella Risk Assessment Training ●
Wednesday 17th May	Cleaning and Disinfection ●
Wednesday 24th May	Basic Legionella Risk Assessment of Water Systems
Tuesday 11th July	Legionella Training for Dutyholders and Responsible Persons incorporating L8 ●

* Delegates attending these courses should first attend the **Cooling and Boiler Water Chemistry Part 1** course or have a good working knowledge of basic terminology.

** Delegates attending the Practical course will be asked to prove that they have previously attended the **Basic Legionella Risk Assessment** course or equivalent.

AUTUMN PROGRAMME 2017

Wednesday 6th September	Cleaning and Disinfection ●
Tuesday 12th September	Cooling and Boiler Water Chemistry - PART 1 ●
Wednesday 13th September	Cooling Water Chemistry (follow on)* ●
Tuesday 19th September	Practical Legionella Risk Assessment** ●
Wednesday 20th September	Legionella Risk Assessment in Cooling Systems ●
Tuesday 26th September	Basic Legionella Risk Assessment of Water Systems
Tuesday 3rd October	Managing the Risk of Legionella in Cooling Tower Systems
Wednesday 4th October	Legionella Training for Dutyholders and Responsible Persons incorporating L8 ●
Tuesday 10th October	Temperature Monitoring, Sampling and Inspection of Water Systems for Technicians ●
Wednesday 11th October	Landlords and Letting Agents Legionella Risk Assessment Training ●
Tuesday 24th October	Foundation Course in Water Treatment Chemistry ●
Tuesday 7th November	HTM 04-01 Water Hygiene Training ●
Wednesday 8th November	Cleaning and Disinfection ●
Tuesday 14th November	Management and Control of Closed Systems ●
Wednesday 15th November	Practical Legionella Risk Assessment** ●
Wednesday 22nd November	Basic Legionella Risk Assessment of Water Systems



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