A Brief History

POOL WATER TREATMENT ADVISORY GROUP

CELEBRATING 40 YEARS

Looking back at 40 years of the Pool Water Treatment Advisory Group it's clear to see how important and influential it's been. It has from the start been a uniquely authoritative, independent, non-commercial member organisation dedicated to raising standards in pool water treatment.

More difficult is to understand how such an unusual organisation has survived. You certainly wouldn't invent it now. A committee unfunded but economically viable, independent and unbiased yet made up largely of commercial operators – PWTAG ought to have drowned years ago. Instead, its influence has increased over the years, in the face of difficult pressures in a very challenging sector. As its only hired hand, I pay tribute to the generations of unpaid work that have made PWTAG what it is today.

PRE-SWIM

At end of the 19th century many swimming pools were filled on a Monday and emptied a week later, with admission prices falling day by day as the water got cloudier. By 1929 the Ministry of Health had got involved and published The Purification of the Water of Swimming Baths (the first 'blue book'). This was revised in 1951 and again in 1975.

In 1931 the National Association of Bath Superintendents started up; three years later it produced its journal, Baths and Bath Engineering. Over the years the names evolved, through ISRM, Recreation magazine and now CIMSPA.

The government got actively involved again in 1978. A DoE sub-committee was established, chaired by Owen Hydes – an important figure, later to become number two in the Drinking Water Inspectorate. The sub-committee recommended that disinfecting pool water with chlorine gas should stop by 1 January 1985 and safer disinfectants be used. Between 1979 and 1983 it published a series of booklets on the interim use of chlorine gas and then its alternatives – hypochlorites, chloroisocyanurates, halogenated dimethylhydantoins, liquid bromine and ozone, also a series on the efficacy of these alternatives.

This initiative culminated in 1984 with the DoE publishing a new version of the blue book – The treatment and quality of swimming pool water. This was also often called the blue book, although it was white. Its 64 pages went through four impressions and was very influential.

That same year, its job done – the DoE thought – the sub-committee was wound up and the government withdrew, leaving the Sports Council with a small budget to police the industry. They immediately set up another committee.

ANOTHER COMMITTEE

The Sports Council Committee on the Treatment of Swimming Pool Water had a membership very similar to that of the now disbanded DoE sub-committee. That was to form the basis for PWTAG. It was chaired by Owen Hydes and had members from the Greater London Council, Swimming Pool and Allied Trades Association, Association of District Councils, Public Health Laboratory Service, British Effluent and Wastewater Association, Heath & Safety Executive, Property Services Agency and Institute of Environmental Health Officers. The Sports Council provided the secretariat and the funding. There were already a few other names that were to become familiar, including Phil Penny, Andy Elphick and Ralph Riley.

PWTAG DIVES IN

Between meetings 5 and 6 the committee's title was changed to the Sports Council Pool Water Treatment Advisory Group. That name lasted just one meeting and it became PWTAG – after the Sports Council decided to reduce its £7,000 annual grant to £1,000, and to withdraw the support it gave in providing a technical secretary.

By now its membership also included the Amateur Swimming Association, Association of County Councils and Institute of Recreation Management. Phil Penny became its first chair and in 1986 Brian Guthrie its part-time secretary and first employee. (The minutes show that in 1988 the secretary was issued with a 'word processor'.)

From the start, PWTAG set out to bridge the gaps between legislation (virtually none), official guidelines (HSE etc) professional bodies (special pleading), academic experts (hard to find) and commercial associations (money). It adopted the perhaps uniquely English solution of inviting them all to join – and pay an annual membership fee. Prejudices and factional interests were largely neutralised, unable to flourish amid the hurly burly of committee meeting debate.

THE EARLY YEARS

Looking at the faded minutes of the first meetings, it's clear that PWTAG quickly started to tackle many subjects that would remain its preoccupations over the next 40 years. Based on their now extensive areas of expertise, they were able to be definitive about important issues that had been unclear and, subject to commercial bias. To list a few:

- pool hydraulics – dilution, filtration, circulation etc
- performance specifications – chemical and microbiological testing, balanced water

- disinfectants other than those based on chlorine; possible innovations; ozone
- foreign comparisons
- the pool environment – air quality, corrosion, tile failure
- disinfection byproducts and their health implications
- dangerous incidents in and around pools.

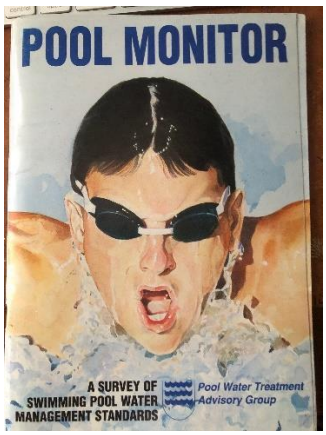
As years went by PWTAG expanded its scope: more organisations joined, it became more confident about its expertise, it took on new subjects and its influence grew. There were difficulties along the way though. It had to take legal advice about libel and was reassured that its single focus and its experience made it safe from prosecution. Nevertheless, time and effort had to be spent seeing off criticism from companies who felt PWTAG's judgments on certain products and processes were unfair.

In 1989 Phil Penny was succeeded as chair by Ralph Riley, followed by Andy Elphick (1995), Ralph Riley again (2000), Howard Gosling (2007), Janice Calvert (2009), John Lee (2013), Janice Calvert again (2016) and the current chair, Colin Day (2023).

Over the years PWTAG's work has been supported by technical advisers as well as members. Some long-serving individuals have been both at different times. One, Dave Whittingham, was only ever a technical adviser, but his expert contribution over 35 years was invaluable – not least towards PWTAG's books.

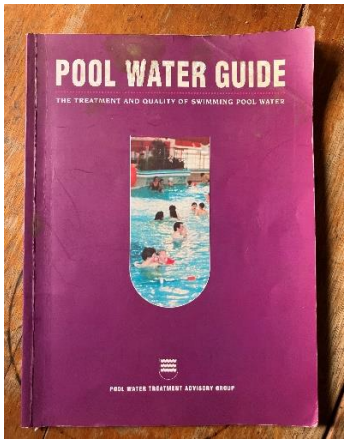
IN PRINT

PWTAG's work started to bear fruit in print. In 1988 they published, jointly with the Sports Council, the results of a survey of pools' experience with what was then a relatively novel disinfectant process – ozone. There were problems with some pools' lack of technical understanding. The British Effluent and Wastewater Association (BEWA) already had an interest in ozone and in 1990 PWTAG and BEWA published a code of practice on its application to pools.



1990 also saw the publication of PWTAG's ***Pool Monitor***, based on a survey of 561 pools. It had interrogated how they handled disinfection, pH, filtration, turnover, bather load, and dilution. It also established what other countries did. Shortcomings were found in the management of a significant minority of pools (and some foreigners did it better).

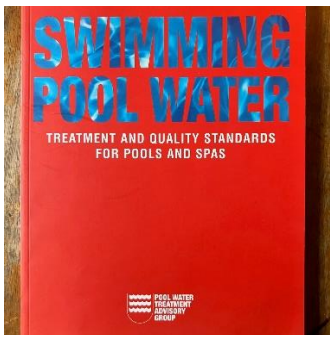
Around this time PWTAG produced a large poster for pools to display, with the headline ***You don't want your eyes to sting, so use the loo before you swim***.



In 1992 the DoE's 'blue book' finally went out of print. PWTAG decided to build on that firm base and produce a much longer, more comprehensive book. The many different interests in PWTAG collaborated in a remarkably collegiate manner. ***Pool Water Guide*** appeared in 1995 and established itself as the bible on the subject, and PWTAG as the authority. It also marked an almost philosophical change, a move away from prescriptive standards towards reasoning, understanding and a measured response. Nevertheless, it was specific about issues like water temperatures, disinfection and dosing, circulation, filtration and turnover. It sold out its 4,000 copies over the next three years. And there were more books to come...

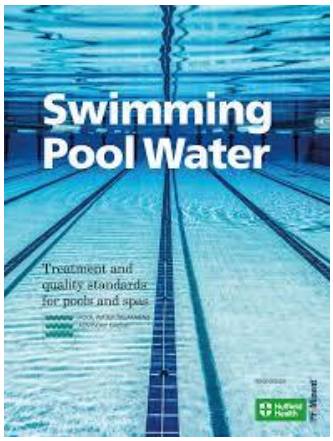
Swimming Pool Water

Pool Water Guide was 74 pages. In 1999 PWTAG published its successor, *Swimming Pool Water*, which weighed in at 142 pages. There was much new material, including on source waters, choosing and dosing disinfectants, delivery and storage of chemicals and circulation. Over the next three years, 5,000 copies were sold.



The new material was informed by the research PWTAG had started to fund, using income from book sales.

Over the next ten years that research continued to contribute to our understanding of swimming pool water. So a second edition in 2009 was able to reflect this. It also had new guidance on interactive water features and a wider range of pools – spas etc and pools in commercial settings like hotels and cruise ships. *Swimming Pool Water* was now 202 pages.

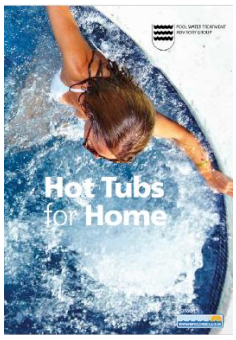


In 2017 the 270 pages of the third edition took on new developments in filtration, UV validation, baby swimming, *Cryptosporidium*, and natural swimming ponds – as well as the usual updating and refining.

Towards the end of 2024, PWTAG is beginning to make plans for a further update of this vital book. Will it be print, digital, both?

Spa pools

PWTAG's big book has always had a few paragraphs about spas. But not until the second edition in 2009 did *Swimming Pool Water* devote a chapter to them. There were publications from PHLS and HSE on the subject. But PWTAG decided there was a need for guidance tailored quite specifically to their operators. *Hot Tubs for Business* appeared in 2018 and *Hot Tubs for Home* in 2022.



ADVICE

PWTAG was available to answer queries and try to solve problems – by phone and letter in the early years, then by email and more recently via its website. Like all PWTAG's guidance, this has been based on its members' expertise, give freely by them – as has their input to PWTAG's work generally, including producing books, code of practice and technical notes.

Among the scores of subjects PWTAG has responded to over the years are grout loss, hardness, gassing, moveable floors, entrapment, head lice, catheter and colostomy bags, herpes, labelling, energy conservation, hydrotherapy, asthma, folliculitis and domestic test strips.

TECHNICAL NOTES

Soon after the first edition of Swimming Pool Water, PWTAG decided not to wait for another edition before issuing fresh advice and guidance as new issues emerged. The first in a series of technical notes appeared in 2010. There have been 70 since, many of them updated, covering such issues as sulphate attack, chemical spillages, algae, gassing, bunds, UV, phosphate, glass filter media, remote monitoring – and most recently ice baths.

Over 1,000 website users access technical notes each month. And subsequent editions of Swimming Pool Water have of course incorporated necessary changes that first appeared in the technical notes.

RESEARCH

Within a year or so of starting up, PWTAG realised it needed to get involved in researching some of the technical uncertainties that bedevilled swimming pool management. In 1986 some basic research demonstrated quantitatively the importance of pre-swim hygiene in minimising the amount of disinfectant chemicals needed. The Kent Environmental Health Officer (Tony Monk, a PWTAG member) showed that showering removed up to 66% of sweat products and 33% of bacteria. This became an important theme in PWTAG's guidelines.

As soon as PWTAG had the funds it looked at two significant areas. By exposing grout prisms to different waters, it was able to establish that, properly applied, grout should not be compromised by hard water in pools. And a careful evaluation of test kits established that it

was realistic to expect them to accurately monitor the fine detail involved in operating pools – as PWTAG was somewhat controversially recommending – with free chlorine levels under 1mg per litre.

As the years went by, income from an expanding membership (and thus fees) and from book sales provided expanded opportunities for research. A recent example is the work funded with Pool Sentry which is using measures of coagulant performance to elucidate the links between pool water turbidity and filtration efficiency – all in the pursuit of good water quality.

Pool Water Research Foundation (PWRF)

In 1994 PWTAG started to invest significantly in research at Cranfield university. Over eight years this spawned two PhDs and an MSc, and a number of papers in scientific journals. The work was based on a one-seventh-scale model swimming pool with a closely controlled environment. This was able to mimic all aspects of pool chemistry and hydraulics and measure every parameter, including disinfection byproducts, in water and air. The work at PWRF raised both the status of such research generally and the authority of PWTAG.

Results emphasised the importance of steady bather loads and smooth control of disinfection. It was also able to measure the value of using ozone and UV. Bromination was found to produce about six times as much trihalomethane as chlorination. Granular activated carbon produced results as least as good as UV.

The end of the research programme at Cranfield was marked by a very successful PWTAG international conference on the campus in 2002. Over 70 delegates attended, some from Switzerland, France and Denmark.

PWTAG was able to combine this work with research at other universities with real pools. A Surrey MSc student did some preliminary work on the dynamics of pool hydraulics and circulation. This linked usefully to work by Brian Croll at Swansea university pool: work with simulated Cryptosporidium spores demonstrated that flocculation and six pool turnovers were necessary and sufficient to remove 99% of what had become a major threat to pool health. This knowledge has been a vital part of very extensive and influential PWTAG guidance ever since.

Product assessment

Usefully, results from this research were able to substantiate and sometimes extend the sort of pool water management guidelines that PWTAG had been promoting for years. It also allowed PWTAG to offer a commercial service testing novel water treatments. There were few takers. Instead, there was extensive and sometimes lively correspondence with manufacturers and distributors about their claims.

This toing and froing was very often inconclusive, but rarely were there serious challenges to PWTAG's assumptions about what would work and what wouldn't. Among the exotica under scrutiny were Oxy-sure, Water King, Algitex, Wapotec, Zeoclere, Surex, Aquanorm, Suntrap Anti-bio, Challenger 3000, BenRad, Baracuda Nature, Enigma Nimrod, Sanogene and Sanosil Super 25.

GUIDELINES AND BEYOND

PWTAG has always looked to collaborate and to make links with other organisations, in the UK and abroad. During the early years PWTAG contributed to HSE's Managing health and safety in swimming pools and a CIBSE design guide. Much later Brian Guthrie attended a series of World Health Organisation workshops in Ann Arbor, Jersey and Rome, which resulted in the 2006 publication, WHO Guidelines on recreational waters vol 2 Swimming Pools and Similar Environments.

Less celebrated was a prolonged collaboration with BSI to produce a standard for pool water management. £15,000 later, a 'publicly available specification' (PAS) emerged in 2003, which in turn people had to buy. By and large they didn't and PWTAG decided it would be more effective to produce its own, freely available code of practice.

PWTAG Code of practice

The code of practice appeared first in 2013, designed as a plantroom and management guide. It was effectively a practical summary of Swimming Pool Water, supplemented by technical notes as they were published. Always online on the website and thus free, it has been updated over the years, with the new material presented separately, so that users can see how it develops. It has been very widely used and still gets about 1,000 hits each month.

PoolMark

In 2017 PWTAG attempted a national standard that would mark pools who had the best of operation – both equipment and procedures. The assessment had its roots in PWTAG's code of practice. The rigorous inspection process and the resulting plaque is visible public assurance that the pool is top quality.

It has not always been easy to persuade pools to take up Poolmark, but over 50 have and the scheme is currently being strengthened and relaunched.

Influence

Partly as a result of PWTAG's various publications and higher public profile, its influence is felt very widely. Pools that follow PWTAG guidelines demonstrate publicly their seriousness. That can also provide evidence in the case of legal issues.

Legislation

PWTAG has always hoped that government might resume some responsibility for pool water – either through legislation or official standards. Even the rough and ready role they have in policing river and sea water would have been better than nothing. But despite regular lobbying, this has been resisted by successive governments and their departments. Maybe this time…

PWTAG TRAINING

Since 2012 PWTAG has been actively involved in encouraging pool management to take staff training more seriously. It started with two basic PWTAG qualifications – swimming pool technical operator (SPTO) and onsite designated supervisor (ODS). Curriculum material was produced, based on existing PWTAG standards and guidance. This material is backed up by a system of inspection and a qualification framework. The training is delivered by PWTAG accredited training organisations and there is an online register of over 10,000 SPTO-qualified individuals.

Over the years other syllabuses have been added – for hot tubs, spas, hydrotherapy and paddling pools, interactive water features and even canine therapy pools. They are all freely available. But the income that derives from the whole training network has been a significant and welcome source of income for PWTAG

PWTAG DEVELOPING

Over the years the core membership of PWTAG – what is now called the **Council**, the decision-making body, composed largely of fee-paying organisations – has expanded. The Council now represents the Aquatic Therapy Association for Chartered Physiotherapists, Energy Managers Association, Report Leisure Safety Group, Royal Society for Public Health, UK Health Security Agency, Swimming Teachers Association, Engineers Ireland, Public Health Wales, Royal Society of Chemistry, Drinking Water Inspectorate, British Chemicals Association, Chartered Institute of Building Services Engineers, Swimming Pool and Allied Trades Association, Institute of Swimming, Institute of Swimming Pool Engineers and Swim England (who also provide PWTAG's Secretariat). **Technical advisers** can also be recruited on to the Council.

Membership

Starting in 2011, PWTAG has extended membership beyond the council. There are **individual** members: 156 affiliates, associates, graduates and full members. One Council member represents the individual members.

Fellowship is awarded to council members of PWTAG who have ten years of service and have made major contributions to the work of PWTAG and/or the industry.

As well as individuals, **organisations** can be recruited to fulfil specific functions. **Industry forum** members allow companies and PWTAG the opportunity for two-way collaboration and participation in PWTAG's work – publications, technical notes etc. There is a similarly constituted **pool operators** forum and one that covers **training**.

All of these continue to provide depth and additional expertise to PWTAG's work, as well as useful additional income.

International conferences

In 2009 PWTAG was proud to host the third in a series of prestigious pool and spa conferences. The venue was the HQ of the Royal College of Physicians in London's Regent's Park. It was a lot of work, demanding many meetings of a sub-committee. But it was worth being able to demonstrate that, although many other countries do more research in this field, the UK has a meaningful role. It was a success.

PWTAG has featured at other conferences in this biennial event – in Porto, Rome, Amsterdam, Kos, Marseille and Bologna.

This PWTAG Conference has been an annual event since 2017. Sometimes it has had to be online but has always attracted excellent speakers from many countries and a good turnout of delegates.

KEEPING POOLS SAFE

Throughout its 40 years, PWTAG has focused on pool safety as well as water quality. The early years included concerns about the effects of **disinfection byproducts** like

trihalomethane and chloramines. PWTAG involved academics and other experts to deliberate on what should be safe levels – and pool experts on how to achieve them. Asthma emerged as a tricky issue, with some alarming reports coming from a newsworthy Belgian medic. Then there was the physical threat byproducts seemed to pose to some pool structures.

Predating PWTAG, studies had indicated a link between the handy disinfectant bromochlorodimethylhydantoin (**BCDMH**) and itchy rashes. This remained a controversial issue for many years, but PWTAG steered a safe path in troubled waters by giving firm guidelines about its use as well as warnings.

Bathers becoming dangerously trapped on outlet **grilles** was an important issue about which PWTAG was able to give firm and precise guidance.

In early years ***Pseudomonas aeruginosa*** probably seemed the trickiest microbiological threat. But good disinfection would deal with it, as it would the very many other pathogenic organisms that PWTAG was able to review and include in its publications

The chlorine-resistant spores of ***Cryptosporidium*** were a different matter and the vomiting and diarrhoea of cryptosporidiosis became the number one problem during the 1990s. The first reported pool outbreak was in 1996. PWTAG addressed the issue, particularly through its early association with the Public Health Laboratory Service and more recently the Cryptosporidium Reference Unit in Wales, under Dr Rachel Chalmers.

A lot of deliberation went into the very detailed and important guidance from PWTAG that has emerged over the years. Close attention to coagulation, filtration and turnover are key. In 2017 PWTAG funded further research, in leisure pools, that reinforced its guidance.

Covid brings us pretty well up to date. The swimming pool world has not fully recovered from the closures and associated problems that emerged in 2020. (Some of that is financial of course.) Once again, PWTAG assembled the best brains on the subject and produced a series of timely guidance notes about how to close a pool and how to reopen. That guidance was taken up by the government, and is still on the website, in the unhappy event that it is needed again.

THE NEXT 40 YEARS

The water is too cloudy for PWTAG's crystal ball to function. But it's fair to say that swimming pools face real challenges, not least of survival in many cases. Yet there are developments that with luck could see pools getting even more comfortable and healthy, with fewer chemicals. What is almost certain is that there will still be a need for the unique expertise and independence of the Pool Water Treatment Advisory Group. It could soon

have a chief executive officer and who knows even possibly a new name. But its principles will stay as pure and clear as the best pool water.

Brian Guthrie March 2025