

AQUA News



December 1998

IWSA—International Water Services Association: AISE—Association Internationale des Services d'Eau

End of Year Editorial

By VICTORIA PAREDES

1998 is now drawing to a close and what an eventful year it has proven to be for IWSA! This time last year I asked you to reflect on the directional change and the new sense of dynamism that was taking place within IWSA. This year we can look upon our progress with some satisfaction.

An historical event took place earlier this year, the ratification of the merger between IWSA and IAWQ: it was approved by both boards in April and June respectively and is now set to take place on 1st August of next year—that's only seven months away.

The new association will be known as the International Water Association and shall have as its 'Objects', '...the improvement of water management, engineering and science through the organisation of meetings of all kinds, the promotion of research and good practice, the production of relevant publications and communications, carrying on public education activities and the provision of opportunities for exchange of information on goods and services'. The IWA will act as a truly global reference point, covering every aspect of water management, from resources to the removal of waste.

In response to members' demands, the IWSA website has been developed allowing members easy access to information about IWSA and its events. Information about our World Congress in Buenos Aires next year will be published very soon on the website in the form of our official Programme and Invitation to Register—indeed, we look forward to seeing you all there!

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The initial success of the Blue Pages has been very encouraging and has resulted in the production of two further titles in the series on 'Nitrates' and 'Monitoring for Compliance', a copy of the latter is enclosed in this issue of *AQUA*. More titles are on their way.

Finally, we have revamped our database in order to help the Secretariat further improve its efficiency, providing you, our members, with a speedier response to your queries and requests. Indeed, I would like to congratulate all the staff at the IWSA Secretariat who have put in many long, extra hours to ensure that the day-to-day management of the IWSA has been minimally af-



fect by the enormous changes that have taken place in 1998, and which will continue to take place throughout 1999.

In all, the year ahead promises to be exciting and new, where the foundations that have been put in place this year for the new association will be consolidated, and where the rewards for all the hard labour of our Board, Council and Secretariat will be reaped to the benefit of our members who will become a part of a much stronger and effective global organisation.

With many wishes to you all for a successful and prosperous 1999.

VICTORIA PAREDES

AQUATECH 98—IWSA Conference in Drinking and Industrial Water Production Amsterdam, the Netherlands, 21–24 September 1998

This IWSA conference, organised in conjunction with AQUATECH and sponsored by the European Desalination Society and the American Waterworks Association, proved to be a resounding success with more than 430 delegates from 43 countries in attendance.

A full programme comprising 90 different papers was presented, with 40 posters placed on display.

At the Opening Ceremony, Professor Jan Schippers of KIWA delivered the welcoming address and Michael Slipper of IWSA opened the conference by highlighting



Jan Schippers

the issues of water security and the extent to which membranes will be increasingly employed in the improvement of water quality.

Two keynote addresses were given by Steven Duranceau of the USA on 'The Role of Membranes in Daily Water Production', and by Heinner Strathmann on 'Industrial Water Treatment, State-of-the-Art and future developments.



Amsterdam canals

At the end of the sessions, technical visits provided delegates with an opportunity to see the latest membrane and ultrafiltration plants

Disinfectant residuals—success of Philadelphia conference repeated in Mülheim, Germany

September, Mülheim: the second conference on the role of disinfectant residuals in drinking water distribution systems took place, supported by the IWSA, AWWA, DVGW and IWW. Eminent academics and professionals from around the world were invited to speak, including Dick van der Kooij of the Netherlands, Owen Hydes of the UK, Francis Rillaerts of Belgium and Rhodes Trussel of the USA.

The conference was opened and Professor Rolf Gimbel of the IWW welcomed the delegates to Germany and wished them a pleasant stay. He outlined the programme of events and hoped that the different points of view reflected in the papers would provide the delegates with some constructive and thought-provoking material. Michael Slipper of the IWSA stressed the importance of global communication and the need to exchange experiences regarding the different practices for the treatment and distribution of water. He added that exposing the Americans to European practices could only be a positive thing. Professor Merkel of DVGW reminded delegates that water must be considered a food-stuff which has a sell-by date and whose packaging should be of the cleanest and highest standards for the

consumer; it was therefore the responsibility of the water companies to make consumers aware of their responsibility to maintain domestic pipe systems. Hans-George Specht, Lord Mayor of Mülheim and Professor Deitmar Kath, Pro-Rector of Gerhard-Mercator University also extended their welcome to the delegates, with Professor Kath stressing the importance of the research-funding trade-off between the university and IWW for the future of the local water industry.

The prevailing issue was undoubtedly the practice of chlorination. Mark LeChevalier of the USA held out for chlorination, arguing that the current control of water quality (in the USA) is such that it does not necessarily guarantee that water distributed without a residual disinfectant is not subject to recontamination or microbial degradation prior to reaching the customer's tap. He stressed that researchers should look to achieving residual disinfection with minimal DSP levels.

Interestingly, Jonathan Clément, also of the USA, argued somewhat to the contrary, suggesting that in the United States, both chlorine and chloramines were used too extensively and in many cases did not provide the expected levels of protection against coliforms. Hence they did not necessarily comprise the most effective approach towards water quality.

Dick van der Kooij of the Netherlands focused on the importance of maintaining a healthy distribution system in order to guarantee and preserve water quality. He argued that the decay of pipe materials inhibited the effectiveness of disinfectant residuals against regrowth, and that in any case they were ineffective against recontamination. It was therefore the task of the engineer to develop and maintain a distribution system that ensures microbiological safety and controls regrowth, the ultimate goal being the distribution of drinking water without disinfectant residuals.

Panel discussion

After all the papers had been presented, there followed a panel discussion, with Epsica Chiru of Romania, Jonathan Clément and Mark LeChevalier of the USA,



Peter Hiemstra of the Netherlands, David Holt of the UK, Wolfgang Kühn of Germany and Dominique Gatel of France sitting on the panel.

Professor Gimbel initiated the session with a question to Peter Hiemstra concerning the potential problems of producing drinking water without disinfectant residuals. Hiemstra's response was twofold: first, he felt it paramount to maintain good relations with the water companies and consumers. This would mean eliminating disinfectant residuals only where it would be feasibly safe to do so; and second, it would depend on how much money was available to invest in the more expensive alternative treatments, and of course in better distribution systems, i.e. the less leakage there is the more chance there is of the water staying healthy. Gimbel then directed his attention to LeChevalier and asked him whether disinfectant residuals ought to be used on ground water resources. His reply was that the USA should, and still does, endorse a multi-barrier approach to disinfection, and only in exceptional cases should this approach be modified. In view of the obligation to protect public health it was important to prepare for contamination by leakage and cross-connections.

In response to a question concerning the costs of investing in a new distribution system, Dick van der Kooij doubted whether in the long-term the costs were any greater than the cost of extensive disinfectant residuals combined with the cost of continual repairs to an ageing distribution system—particularly if it consisted of

unlined cast iron pipes, as can be the case in the USA. Clément supported this argument, stating that such pipes could not sustain chlorine residuals in a quantity that would be effective, and this would be particularly pertinent in cases where a policy of low water pressure was pursued by water companies.

Mr Kühn of Germany added that a lot depended on the quality of the water source and that a high level of investment was needed to replace a distribution system. He did not see any harm in occasionally using residuals when required and declared that in any distribution system there was always a possibility of recontamination. Again, Clément questioned the effectiveness of chlorine in cases of recontamination and advocated improvements to the distribution system as a better strategy, citing the Netherlands as an example where treatment costs have been substantially reduced and the water quality improved, thanks to an excellent distribution system.

David Holt of the UK stressed the importance of considering the health issues of chlorine and declared that in the long-term it was perhaps wiser to opt for a better distribution system; he warned against using high levels of residuals to mask a bad practice and poor distribution systems.

Finally, Dominique Gatel of France concluded the panel discussion by underlining the need to increase consumer awareness of how water companies are actively seeking to improve drinking water quality and how it would be of benefit to involve local decision makers in the maintenance and improvement of the local water supply.

Conclusions

The following conclusions to the conference were then presented in for-or-against residuals format:

For:

- Achieve microbiological standards
- Minimise biofilm and occurrence of macro-organisms



Flehe Treatment Works.

- Prevent recontamination of water during distribution
- Indicate whether contamination has occurred when the residual is lost

Against:

- They are not needed for microbiologically sound groundwater and some surface waters
- There already exist treatments to minimise organic material which minimises biofilm production and macro-organisms
- To avoid the formation of disinfection by-products
- The distribution system can be kept clean by appropriate maintenance including flushing.

Poster presentation

In total there were 11 posters which were short-listed for the final presentation. Mr Jost Wingender of IWW was announced the winner for his innovative poster on the Role of Biofilm and Slime Formation and Effect of Chlorine, Monochloramine, Hydrogen Peroxide and Silver on *Pseudomonas Aeruginosa*.

Technical visits

To round up the conference, technical visits were arranged to the water works of Kettwig, Flehe, Holsterhausen and Haltern.

ALTRAN's £11 000 innovation award

Altran Technologies, the French-based technology consulting group, is launching its 1999 'Foundation for Innovation', a highly prestigious international award offering £11 000 and one year's development support to the global winner. The one year of support includes access to an assistance from Altran's 5500 technology consultants and managers in developing the winning project into a commercially viable proposition. The award is open to company research and development teams, schools and universities, public or private research organisations and associations.

Originally set up in France in June, 1996 to help benefit the community through innovation and technology, the Altran Foundation is now open to international entrants.

The theme for the 1999 Foundation, 'access to and the quality of water', is an issue of crucial importance to all countries around the world. This year's judging panel will be looking for technology which will apply not only to Western countries but also to the East and developing countries, where the key objectives are low cost and easy use.

Entries for the Foundation should be made over the Internet, between November 1998 and February 1999, through the Altran website at <<http://www.altran.fr/indexe.htm>>. Applications will be assessed on criteria defined by the Foundation, including innovation, technical and economic feasibility and the potential to create jobs. Around seven short-listed entrants will be chosen to present their projects to a grand judging 'jury' during May 1999, with a maximum of three winners announced in June.

Commenting on Altran's commitment to the Foundation, Michel Friedlander, Senior Executive Vice President of Altran Technologies and President of the award, says: 'The aim of the Foundation is to create innovative technology that benefits everyone. On an international basis, this year's water theme embraces a host of problems facing the world, from drinking water through to irrigation. Even in developed countries such as the UK there are major problems with water, including the need to transfer drinking water from source to user with more efficiency and fewer leaks, which currently account for between 20% and 40% of wastage.'

Altran Technologies provides a broad range of tech-

nology consultancy from feasibility studies through to design, development and implementation for many of the world's leading companies. Outside Europe, the Altran Group operates in more than 30 countries around the world. Altran frequently works on multi-national projects and a large proportion of clients are global companies.

WASSER BERLIN 2000 23–27 October 2000

From 23–27 October 2000, 5000 water industry specialists from all over the world are expected to attend the WASSER BERLIN 2000 congress and its partner events, in order to consider all aspects of the topic of water in an international context and to discuss the latest developments in the water industry.

In order to offer all industry professionals the opportunity to participate in this focal event for the German water industry, an initial call for papers has been issued, which will serve as a basis for the compilation of the congress programme. The WASSER BERLIN 2000 congress focuses on two key themes:

- 'The political, economic and social framework of water resources management: where are we heading and where should we be heading?'
- 'Frameworks for sustainable development in water resources management.'

Specialist topics within this broad outline include developments in European water policy and economic deregulation and privatisation, in contrast to increased European and national regulation. Also to be considered are future environmental water quality targets and standards, together with their effect on economic and social consequences, the role of European standard techniques, and the economic significance of technology transfer. The ecological, economic and social criteria for defining sustainable development are to be presented, and this frequently used expression is to be translated into concrete terms. The conflicts between the social sectors in the water industry are to be presented and discussed, together with case studies for sustainable water management, including co-operation between agriculture and water management, water management in metropolitan areas and substance management in water protection.

Further details on all the planned discussion topics and the organisational sequence of events can be obtained from the call for papers leaflet. Interested industry specialists can request this leaflet directly from the WASSER BERLIN Kongress und Ausstellung eV, Messedamm 22, 14055 Berlin, Tel.: +49 30 30 38 2085, fax: +49 30 30 38 2079, <http://www.messe-berlin.de>, e-mail: wasser@messe-berlin.de

AWWA Research Foundation

The Microbial/Disinfection By-Product (M/DBP) Council, a partnership between the American Water Works Association Research Foundation (AWWARF) and the United States Environmental Protection Agency (USEPA), announces the selection of new research projects approved for funding in 1999. The objective of the M/DBP Council is to provide a vehicle for the selection and funding of research regarding the control of microbial contaminants in drinking water, balanced against the by-products of disinfection.

Requests for proposals (RFPs) for these projects are available on the AWWARF website <<http://www.awwarf.com>>. Proposals submitted in response to RFPs must be postmarked by 1 February 1999. Unless otherwise indicated, project proposals must include 25% of the total project budgets in-kind or cash contribution. In-kind contributions can be in the form of labour, laboratory services, or other support, and may come from utilities, consulting firms or universities. Contract awards for all projects will be determined by an AWWARF project advisory committee appointed for each project. Proposal evaluation will be based on responsiveness to the RFP, scientific and technical merit, and qualifications of the researchers.

Listed below are descriptions of the new projects and their maximum funding levels

- **Study of Spontaneous Abortions and Disinfection By-Product (DBP) Exposures (RFP 2579).** Determine if the results reported by the 1998 Waller *et al.* Study can be replicated in other areas of the United States. Investigate whether exposure to trihalomethanes (THMs) (especially bromodichloromethane [BDCM]), haloacetic acid species (HAAs), or other disinfection by-products (DBPs) may be associated with an increased risk of spontaneous abortions. If feasible, other repro-

ductive end-points may be included in the study. (US\$1000 000 for the first phase.)

- **Infectious Disease Associated with Drinking Water from Surface Water Sources—Microbiological Water Quality Factors (RFP 2580).** Assess the microbiological water quality of drinking water and evaluate pathogen occurrence risk factors in conjunction with the Centres for Disease Control and Prevention (CDC) epidemiology study. This study would include a population in a large community supplied by a public drinking water supply with a surface water source. (\$400 000)

- **Infectious Disease Associated with Drinking Water from Ground Water Sources—Microbiological Water Quality Factors (RFP 2581).** Assess the microbiological water quality of drinking water and evaluate pathogen occurrence risk factors in conjunction with the Centres for Disease Control and Prevention (CDC) epidemiology study. This study would include a population in a large community supplied by a public drinking water supply with a groundwater source. (\$300 000)

- **Exposure Assessment on Existing cancer Studies (RFP 2582).** Improve DBP risk estimates with respect to specific classes of DBPs by improving the exposure assessment models of specific DBPs of health concern. (\$200 000).

The Meteorological Office and Thames Water launch Burstcast

New Service to provide forecast of cast-iron underground pipe bursts for water companies.

The UK Meteorological Office, in association with Thames Water, has unveiled a new state-of-the art forecasting service. *Burstcast* is designed to anticipate the number of additional bursts in cast-iron underground pipes due to cold weather. This enables water companies to put response teams in the right place at the right time, thereby providing a higher quality of service to customers through the winter months. The implications of burst pipes are serious: loss of supply, contaminated water and costs mounting to thousands of pounds.

Burstcast uses a specialised meteorological forecast developed through extensive research by the Met. Of-

fic and Thames Water. It is able to give a detailed forecast of the total number of cast iron pipe failures up to five days in advance, targeted by local regions. It can also give a more general prediction of bursts up to 30 days in advance. This information, which is updated daily, will allow water companies to produce contingency plans, and will ensure speedier repairs to reduce water loss and unnecessary costs. *Burstcast* allows water companies to predict peak demand and establish trends over longer periods of time, such as the winter and summer months, and therefore allows companies to take a proactive approach to customer service.

The system works by establishing a link between the temperature of the ground 30 cm beneath the road's service, using the 700 road sensors located around the UK, and the number of bursts that result at that temperature. Using road sensors is particularly useful, since bursts on major pipelines under the road systems can be very accurately predicted.

Mike Tutton, Operational Risk Manager from Thames Water said: 'There are 31 000 km of mains and 18 million joints in the Thames Water region alone, and these become very vulnerable during cold winters. The new *Burstcast* system will prove invaluable this winter in giving our customers the highest standard of service, whilst reducing subcontractor and staff costs.'

The system can be used around the globe wherever cast iron pipes are used in water distribution systems and enquires have already been received from Canada, Romania and Poland.

In addition to *Burstcast*, the Met. Office provides an extensive range of services to the water industry including:

- Weather Sensitivity Analyses identifying the links between weather elements and consumer demand, and allowing water companies to formulate strategic plans for staffing levels and distribution systems.
- Sewer Flooding Register service for water engineers, utilising real-time rain-gauge and radar data, to assist UK managers with decision-making on property flooding.
- MORECS gives an assessment of general soil moisture status divided into areas of 40 km;
- MIST, a PC-based weather information system which goes direct to Operational Control Centres, is used to schedule maintenance and site access, co-ordinate fleet vehicle activity, and monitor river-flow and sewerage systems.

For further information contact: Thames Water Press Office, tel.: +44 (0) 1189 593364; or The Met. Office Press Office, tel.: +44 (0) 1344 856655.

Prescott pushes for a better environment coupled with cuts in water bills in England and Wales

Water companies should undertake a substantial programme of investment to improve water quality and the water environment in the first five years of the new millennium. But there should still be scope for substantial cuts in the average water bill, Deputy Prime Minister John Prescott said.

Mr Prescott and Ron Davies, Secretary of State for Wales, published guidelines on the drinking water and environmental improvements which Ministers want the water industry to achieve between 2000 and 2005. The Director General of Water Services, Ian Byatt, will need to take account of these requirements when setting price limits for water companies.

The package of improvements will deliver the following key outcomes:

- Meet drinking water standards specified in the new EC Drinking Water Directive, including making a start on the programme to replace lead pipes which will be necessary to meet the tougher lead standard which will apply from 2013;
- Protect Habitats Directive sites and Sites of Special



Deputy Prime Minister John Prescott

Scientific Interest (SSSIs) from the adverse effects of discharges and abstractions;

- Improve sewage treatment. In particular, secondary treatment will be the minimum requirement for significant coastal discharges in England and Wales;
- Achieve a significant increase in bathing water standards, particularly in the level of compliance with guideline standards under the Bathing Waters Directive—with the aim of enabling more resorts to gain 'Blue Flag' status;
- Accelerate the programme to improve unsatisfactory sewer outflows which deposit unhygienic and distasteful solids on river banks and beaches during rainstorms; and
- Make faster progress in meeting River Quality Objectives—the basic measure of river water quality—which were set at the time of privatisation.

Mr Prescott said:

'At our Water Summit last year, which I held within three weeks of coming into office, I said I want to start fighting on behalf of the customer. We also needed to shift the balance to help the environment. So we set out a ten-point action plan for a better water industry.

'We tackled leakage as a priority and are looking to achieve a 20% reduction in the first two years. We will continue to press water companies to drive down leakage and the Director General of Water Services will shortly announce leakage targets for next, 1999–2000.

'We have consulted on proposals for a fairer system for water charges, and changes to the abstraction licensing system to take more account of the environment. We will announce our decisions in both areas in the next few months.

'I was pleased that the water industry responded positively to our proposals. We are now starting to achieve our aim of giving this country a world-class, water-efficient, environmentally sustainable water industry.

'Today I am announcing the next stage in achieving that, with a wide ranging programme which is going to protect our beaches and rivers, make further improvements to our drinking water and protect our precious nature conservation sites,' said Mr Prescott.

In deciding on the guidance to give to Mr Byatt, we need to strike the right balance between protecting and improving the environment and ensuring that hard-pressed consumers are not faced with unreasonably high water bills.

'This package enables positive progress to be made in all areas which the Environment Agency identified as priorities, and fulfils our manifesto commitment to regulate in the interests of the environment and the consumer.'

Mr Prescott said that it would be important to implement the Government's objectives in a way which is sensitive to the concerns of different regions, so that it does not cause any individual company's customers to face price changes which are strongly out of line with the national picture.

'Mr Byatt is an independent regulator, operating at arms' length from the Government,' said Mr Prescott. 'We determine the environment and quality programme. But it is for him to decide on the economic assumptions which he will make in setting prices and on the profile of price changes. We have made clear that consumers will want to know that the money they pay for water is being spent wisely and responsibly, and that we believe



Michael Meacher

they want some relative stability in their bills.'

Michael Meacher, Minister for the Environment stressed the need to improve the state of our British beaches to achieve the Blue Flag standard. This would mean continuing to reduce the number of sewer outflows on beaches and rivers. He expects to have two-thirds of substandard outflows dealt with by the year 2000.

New Members

IWSA is pleased to welcome our new Associate and Individual members:

Seattle Public Utilities	USA
Mr T. Stenström	Sweden
Mr M. Guella	Italy
Mr J. van Loon	Netherlands
Mr C. Katchy	Nigeria
Mr C. Thomasson	Netherlands
Mrs S. Tokajian	Lebanon
Mr F. Hashwa	Lebanon

Mr Hashwa is a professor of microbiology at the Lebanese American University in Byblos Lebanon. His research interests are in Environmental Microbiology of ground, surface and marine water systems. He is currently involved in an EU-funded project dealing with: 'Control of Bacterial Regrowth in Water Distribution Systems in 'Water Short European and Mediterranean countries.

FEATURE ARTICLE

Urban water management is undergoing metamorphosis*

BY JAC VAN TUIJN

A number of communities in the Netherlands are planning new housing developments that will have completely different water management systems. Local governments are fond of attractive ponds and water gardens, and water management authorities are seeking ways to improve the recycling of water. Much effort is currently going into the development of technical fa-

cilities required or these new methods of water management.

Water is becoming an increasingly prominent feature in residential areas. Local governments, project developers and urban planners have come to view water as a source of inspiration rather than as a threat. Mr Frankan der Heijden, a water management consultant with Arcadis, has definitely noticed the effects of this trend on his job. He says, 'Developers used to wait quite a while before contacting us for hydrological soil analyses for new housing developments. That has changed. Out of necessity, new residential districts are increasingly being planned in areas where water management is more difficult. It is therefore becoming increasingly important to conduct hydrological soil analyses before urban planners can start their work. As a water management consultant, I am becoming increasingly involved in projects from the very start. I assist local governments in preparing water management plans.' Mr van der Heijden is currently working on eight different new housing developments, and the planners have thoroughly studied possibilities to fit in new types of water management. The focus is on sustainable urban water management, i.e. water should not only be used for aesthetic reasons, but rainwater should be recycled for use by residents. Mr van der Heijden views sustainable water management as an unstoppable trend, since it helps to prevent desiccation and it reduces the amount of waste water to be purified, resulting in lower costs. Sustainable urban water management calls for new technologies so that new methods can be developed for draining rainwater and managing groundwater levels. Much effort is currently going into the development of such technologies.

An improved water balance

The focus of water management has always been a defensive one: how to discharge water as quickly as possible. 'Most water management plans are entirely focused on managing groundwater levels,' says Mr van der Heijden based on his experience. He regrets this, since there is so much more that can be done with water. 'In Tilburg, we are currently studying possibilities to use surface water as a water supply for households. We are also looking for ways to purify wastewater locally by means of bioreactors and to use the effluent as a water

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supply for households.' The legal and financial aspects of these plans still have to be evaluated. Another attractive option according to Mr van der Heijden would be to use percolating water as a water supply for households. This possibility is currently being tested during a trial project in Veenendaal, where a separate drainage system has been installed in addition to the waste water drains so that the percolating water can be returned to residents for renewed use.

Direct use of rainwater

One of the first considerations when separating rainwater in new housing developments is whether the water can be used directly. The most direct option would be the installation of a reservoir for collection the rainwater which could then be used for flushing toilets. Mr van der Heijden considers it highly unlikely that a whole residential area would be equipped with such individual reservoirs. First of all, they cost five to six thousand guilders. So that is would take rather a long time to recover the costs. Furthermore, there is a risk that residents who have problems maintaining their reservoirs might switch back to the regular drinking water supply. In that case, the rainwater would again be drained into the sewage system.'

Infiltration

The most obvious options for much of the Netherlands would be the infiltration of rainwater into the soil. Unlike higher regions with sandy soil, which would not cause any problems, regions with high groundwater levels would require various technical facilities in order to prevent groundwater problems. Such facilities might include individual infiltration systems for each residence or a collective, public system. Again, Mr van der Heijden is not too enthusiastic about the option of individual infiltration systems, since they may be expensive or require a considerable amount of space, 'I think that collective systems would include a central of local facility which could be installed either above ground, depending upon the amount of space available. An example of above ground facility would be a wadi, and an example of an underground facility would be a tank for buffering the rainwater. In either case, the rainwater would flow to a collecting pint and subsequently infiltrate into the soil.' According to Mr van der Heijden, much development work in this area has been done in Germany where such systems have been installed for many years

in order to slow down rainwater flowing from paved areas with steep inclines. Nonetheless, he thinks that there is much room for improvement. 'Grass concrete porous paving clinkers, for example, are not very attractive because they allow weeds to grow through. Other types of pavement, or the proper management of green areas, might help to solve this problem.'

Vulnerable

'Having nothing at all is still pretty much the standard,' Mr van der Heijden concludes with reference to facilities required for sustainable urban water management. The preparation of water management plans by local governments is a complicated process involving a large number of people. Mr van der Heijden points out that public support among future management authorities, as well as residents, should be carefully monitored 'The system is vulnerable. For example, the use of pesticides and people washing their cars at home can cause problems. Thus, it would require a considerable amount of social control,' says Mr van der Heijden. The latest developments have made a tremendous impact, resulting in many studies as to what can be separated and what cannot, and what can be purified locally and what cannot, as well as studies regarding possibilities for the renewed usage of waste water. Much of this depends on the technical possibilities available. This is a whole new area to be explored by suppliers from the water management industry.

Conclusion

Water management in urban areas currently attracts a great deal of attention; local governments as well as an increasing number of project developers recognise the many possibilities that it offers to improve the quality of life, to perhaps reduce the cost of water management and to prevent desiccation.

Sustainable water management would be possible primarily:

- By separating rainwater and collecting it in storage tanks as a replacement for drinking water; or by separating rainwater and subsequent aboveground or underground infiltration; or
- By using percolating water as a replacement for drinking water; or
- By using effluent water from water purification systems as a replacement for drinking water.



events



18–19 January 1999, Amsterdam, the Netherlands

IWSA Statistics and Economics Committee International Workshop

Further information: Guu Achttienribbe, VEWIN, Rijswijk, the Netherlands. Tel.: +31 70 414 47 79.



19–21 January 1999, Pragati Maidan, New Delhi, India

Water Asia 1999—International Conference and Exhibition on Asian Water Industry

Further information: Interads Ltd, A113, Shivalik, New Delhi 110017, India. Tel.: +91 11 628 3018/19, 628 5301, 628 5482; fax: +91 11 622 8928, 641 0216; e-mail: watersia@ndb.vsnl.net.in

19–22 January 1999, Wanchai, Hongkong, PR China
International conference entitled 'Water Industries Conference—Hong Kong 1998'

Further information: Meeting Planners, Conference Secretariat, %/F Pico Tower, 66 Gloucester Road, Wanchai, Hong Kong. tel.: +852 2509 3430; fax: +852 2667 6927; e-mail: info@mphk.com

11–13 February 1999, Lucknow, India
IWWA convention on Management for Sustainability of Water

Further information: Mr J. C. Singhal, organising secretary, B-973, Mahanagar, Sector-A, Lucknow, India



23–24 February 1999, Warrington, UK

IWSA Specialised Conference on 'Rapid Microbiological monitoring methods'

Further information: IWSA Secretariat, 1 Queen Anne's Gate, London, SW1H 9BT, UK. Tel.: +44 171 957 4567. Fax: +44 171 222 7243, e-mail: iwsa@dial.pipex.com

5–8 March 1999, Alexandria, Egypt

Fourth International Water Technology Conference

Further information: Professor Magdy Abou Rayan. Tel./fax: +20 203 5970641 or +20 2050–347900; e-mail: mrayan@dataxprs.com.eg or mrayan@mum.mans.eun.eg

10 March 1999, Medmenham, UK

Seminar on 'Materials in Contact with Drinking Water—Interpretation of Regulation 25 and Related Issues Concerning Product Approval'

Further information: Nicola Barnard, WRc plc, Henley Road, Medmenham, Marlow, Bucks SL7 2HD. Tel.: +44 1491 571 531; fax: +44 1491 579 094; website: <http://www.WRcplc.co.uk>

10–13 March 1999, San Luis Obispo, California, USA
USCID conference on Benchmarking Irrigation System Performance Using Water Measurement and Water Balances.

Further information: Larry D. Stephens, USCID, 1616 Seventeenth St, Suite 483, Denver, CO 80202, USA. Tel.: +1 303 628 5430; fax: +1 303 628 5431; e-mail: stephens@uscid.org

11–14 April 1999, Adelaide, Australia

18th Federal Convention of the Australian Water and Wastewater Association—Water Solutions.

Further information: Convention Secretariat, PO Box 388, Artarmon, NSW 2064, Australia. Tel.: +61 2 9413 1288; e-mail: awwa@abol.net



20–21 May 1999, Torino, Italy

IWSA/Azienda Acque Metropolitane Torino Workshop on Geographic Information Systems (GIS)

Further information: Francisco Cubillo, Canal de Isabel II, Calle Santa Engracia 125, 28003 Madrid Spain. Tel.: +34 91445 1000; fax: +34 91 446 3101; e-mail: cubillo@mx3.redestb.es



events

22–27 August 1999, Graz, Austria

28th Biennial Congress of the International Association for Hydraulic Research (IAHR)

Further information: Heinz Bergmann, Technical University Graz, Mandellstrasse 9, A-8010 Graz, Austria. Tel.: +43 316 873 6260; fax: +43 316 873 6264; e-mail: bergamm@hydro.tu-graz.ac.at

11–19 September 1999, Granada, Spain

17th International Congress on 'Water and Agriculture in the Next Millennium', of the International Commission on Irrigation and Drainage

Further information: Ms Catherine Roy, Secretary of the 17th ICD International Congress, Confederación Hidrográfica del Guadalquivir, Avda de Madrid 7, 11th floor, 18012 Granada, Spain. Tel.: +34 58 29 59 84; fax: +34 58 27 06 41



18–24 September 1999, Buenos Aires, Argentina

22nd World Congress and Exhibition.

Further information: IWSA Secretariat, 1 Queen Anne's Gate, London, SW1H 9BT, UK. Tel.: +44 171 957 4567; fax: +44 171 222 7243, e-mail: iwsa@dial.pipex.com

21–25 February 2000, Durban, South Africa

10th UADE/UAWS Congress on Partnerships and Sustainable Development in the Water Supply and Sanitation sector.

Further information: UAWS Administrative Secretary, 01 BP 1843 Abidjan, Côte d'Ivoire. Tel.: +225 24 14 43; fax: +225 24 26 29.

20–24 June 2000, Colorado, USA

International conference on the challenges facing irrigation and drainage in the New Millennium: meeting human and environmental needs through sustainability rehabilitation and modernisation

Further information: US Committee on Irrigation and Drainage, 1616 Seventeenth Street, #483 Denver, CO 80202, USA. Tel.: +1 303 628 5430; +1 303 628 5431; e-mail: stephens@uscid.org



3–6 July 2000, Paris, France

IWSA Specialised Conference and IAWQ/IWSA Biennial Conference

Further information: IWSA Secretariat, 1 Queen Anne's Gate, London, SW1H 9BT, UK. Tel.: +44 171 957 4567, fax: +44 171 222 7243, e-mail: iwsa@dial.pipex.com

11–13 September, 2000, Helsinki, Finland

Helsinki DAF '2000 Conference.

Further information: Mr Eero Teerikangas, Finnish Water and Waste Water Works Association, Ratavartijankatu 2A, 00520 Helsinki, Finland. Tel.: +358 9 40 5606743; fax: +358 9 1 484750; e-mail: daf@vvy.fi

23–27 October, 2000, Berlin, Germany

Wasser Berlin 2000

Further information: Mr Peter Koppen, Messe Berlin, Messedamm 22, 14055 Berlin, Germany. Tel.: +49 30 30 38 22 75; fax: +49 30 30 38 21 41.

If you would like to contribute to, or comment on the production of *AQUA News*, please contact: Miss Victoria Elena Paredes, Editor, *AQUA*, IWSA, 1 Queen Anne's Gate, London SW1H 9BT, UK. Tel.: +44 (0)171 957 4567; Fax: +44 (0)171 222 7243; E-mail: AQUA@dial.pipex.com

new publications

The Watsave scenario. Edited by Dr M. A. Chitale. Available from the International Commission on Irrigation and Drainage, 48 Nyaya Marg, Chanakyapuri, New Delhi 110021, India, tel.: +91 11 611 5679/6837; fax: +91 11 611 5962; e-mail: <icoiad@giasdl01.vsnl.net.in>, paperback; 1998; pp. 98.

Pursuant to the Earth Summit's Agenda 21, this report represents the results of a questionnaire sent to 66 countries inviting detailed information on their activities for water saving. The questionnaire sought information about all aspects of water uses and about the procedures and controls established for saving water. Information was also requested about the potential for the reuse of municipal wastewater, industrial effluents and/or the use of recycled drainage water or desalinated water.

ICID was very pleased to receive responses from as many as 27 countries around the world. Four of these submitted only brief notes about their activities, but seven countries also furnished data from their case studies. The coverage in terms of area irrigated in the world as represented by these 27 responses is quite large, i.e. 60% of the world's irrigated area. The responses from Africa represent 40% of the irrigated area of the continent and Asian responses constitute 92% of the irrigated area in Asia. It is true that the South American experience is not yet well reflected, with only 14% of the irrigated area being represented by the responses received. The purpose of this survey is to share the compiled information with the total management of water at large, and in the management of irrigation water in particular, to achieve the object of 'Watsave'.

Despite some limitations in the responses from the Committees, some patterns in Watsave practices are clearly discernible from the replies. They have been highlighted in this compilation. Examples of the Watsave practices that are already in vogue, and the important features of some of the Watsave programmes are also highlighted in this publication. Taken together these indicate the path that may have to be followed in the future.

Industry, Freshwater and Sustainable development.

By Mr Albert Fry. Available from the World Business Council for Sustainable Development (WBCSD), 160 route de Florissant, CH-1231 Conches, Geneva, Switzerland. Tel.: +41 22 839 31 00; fax: +41 22 839 3131; e-mail: <info@wbcSD.ch>, paperback; 1998; pp. 66; ISBN: 2 940240 00 0.

This report is a joint publication by the United Nations Environment Programme (UNEP) and the World Business Council for Sustainable Development (WBCSD). It is meant to serve as an example of cooperation between an international governmental organisation and a business group in disseminating information on freshwater, a subject of vital importance to human survival and socio-economic development. Seldom do individuals consider the many uses of this irreplaceable resource—drinking, cooking, cleaning growing food and livestock, fisheries and aquaculture, industry, recreation, power generation, transport of goods and aesthetics. It is only through such unique partnerships that effective solutions can be found to critical issues such as access to, and sustainable supplies of, freshwater.

UNEP's primary interest is guaranteeing adequate fresh water to protect the natural environment and aquatic life, as well as meeting human needs. It is the natural environment that provides the basic commodity of freshwater. However, human activity has the potential to degrade the quality and restrict the quantity of water that is available to all users. The primary focus of business is on ensuring access to process water or its operations. However, in developing this document, it was quite notable to discover the commonality of interests. Both organisations are committed to the concept of sustainable development. WBCSD's emphasis on 'eco-efficiency' complements UNEP's 'cleaner production' programme, and its emphasis on environmentally sound technology. Programmes within each organisation are moving towards pollution prevention and away from remedial action. Each recognises industry's technical competence, managerial skills and financial resources to improve water use efficiency. Each of them are also committed to protecting our natural environment.

The case studies in this report give examples of how progressive companies are protecting water, using less water, recycling and reusing water and preventing pollution. All of these actions limit pollution levels and serve to enhance water quality, thereby facilitating our ability to readily reuse this resource. In developing this joint publication, the UNEP and WBCSD agreed that both organisations need to get this message out to a broader cross-section of industry and other important water users.

The Thames Embankment. By Dale H. Porter. Available from The University of Akron Press, 374B Bierce Library,

new publications

Akron, OH 44325-1703. Tel.: +1 330 972 5342; fax: +1 330 972 6383; e-mail: <press@uakron.edu>, 1998; pp. 318; Hardback price \$49.95; ISBN: 1 884836 23 3; or paperback \$24.95; ISBN: 1 884836 29 1.

Any large-scale construction project is a complex of contingencies pitting the volatility of nature against human ingenuity and setting the discord of human nature against itself. In *The Thames Embankment*, Dale H. Porter explores the tangled history of a monumental venture in Victorian London, telling with wit and authority the stories of those involved in, and affected by, this rough-and-tumble process, from 'mudlarks' and 'wharfingers' to prime ministers and lords.

The embankment of the Thames River is often considered the final element of the London Main Drainage, a great engineering project that carried the sewage of the crowded metropolis down the Thames valley and reduced the toxic pollution of the river and surrounding neighbourhoods. However, the Embankment, whose construction took almost fifty years from concept to completion, achieved fame in its own right as an immense, expensive and successful event that reflected the cultural ecology of Victorian society.

In this richly detailed and multifaceted study, Dale H. Porter reveals the intricate weave of values and practices—environmental, political, economic, technological and aesthetic—that made possible the planning and building of these structures, which altered and became a permanent part of the London riverscape. Above all, *The Thames Embankment* shows how innovations in technology, in environmental assessment, and in the formation of public policy, not only lead to public works projects but are, in turn, stimulated and shaped by them.

Middle East & World Water Directory, 1998 edition.

Available from the Arab Water World, PO Box 13-5121 Chouran, Beirut, Lebanon. Tel.: +961 1 352413/746869; fax: +961 1 352419/802950; e-mail: <info@chatilapublishing.com.lb>, Paperback 1998; price \$60.

The 1998 edition of the *Middle East & World Water Directory* has been compiled by the editors and staff of *Arab Water World* journal. Each listing has been revised and checked to act as a working tool for manufacturers, exporters, consultants, contractors and importers of various equipment and instruments used in the water and sewage industry.

The *Middle East & World Water Directory* consists of two volumes bound under one cover and jammed with information that is impossible to find elsewhere. Each

volume has its own alphabetical and product activity indexes.

Volume I. This documents over 1970 listings of importers, contractors, consulting engineers, distributors to public and private sector firms serving the water and sewage industry in 20 countries located in the Middle East and Anglo-phone Africa. These firms are engaged in well drilling, pumping, water and wastewater treatment, desalination, irrigation, water transmission, hydrology, groundwater and geophysical prospecting, dam construction, etc.

Volume II. Documents over 1110 listings to manufacturers, exporters and consulting engineers located in 23 countries in North America, Europe, Asia and Australia. All these firms are engaged or planning to be engaged in selling the water and sewage industry of the Middle East and Africa.

Pollution Risk Assessment and Management. Edited by E.T. Douben. Published by John Wiley & Sons Ltd. 1 Odlands Way, Bognor Regis, West Sussex, PO22 9SA, UK. Tel.: +44 1243 779777; fax: +44 1243 775878; e-mail: <rrobinson@wiley.co.uk>, Hardback 1998; price £85.00.

Recognising that pollution risk assessment is more than the pure scientific analysis of a given pollution problem, this authoritative volume examines key themes within pollution control including:

- perspectives on pollution risk;
- sustainable development;
- air, aquatic and soil dispersion modelling;
- non-standard emissions;
- human health and environmental protection standards and risk;
- toxicity assessment and its role in regulation;
- biomarkers for monitoring and measuring effects;
- socio-economics dimensions of pollution control;
- legal and political considerations; and
- public perception and communication of risk.

Contributions from both Europe and North America ensure that this book presents a global overview, and whilst *Pollution Risk Assessment and Management* is by no means a 'recipe book', it is strategic and practical, both in approach and outlook.

The success of pollution risk management is dependent on the availability of relevant information and this accessible volume is a valuable resource for professionals within government departments, local authorities, regulators, major industries and academia.

product and company news

USF has introduced a range of stainless steel reverse osmosis systems in response to market demand in Europe

The SanPRO I comprises three compact units capable of producing flows from 500 to 15 000 L/h of high purity water for pharmaceutical, biotechnology and cosmetics applications.

The systems can remove up to 98% of dissolved organics and over 99% of total dissolved organics, colloidal and particles of greater than 200 daltons molecular weight.

French multinational Suez Lyonnaise des Eaux des Eaux and AIT sign R&D agreement in Asia Pacific water management

On 2 October, Lyonnaise des Eaux, the water division of the French multinational Suez Lyonnaise des Eaux, signed a US\$1 million regional R&D project with the Asia Institute of Technology (AIT), focusing on water management.

Lyonnaise des Eaux will fund a five-man research team based at AIT. The team will focus on hydrology and water quality, the protection of water resources, and a development of state-of-the-art tools for simulating catchment areas, rivers, lakes and estuaries.

Mr Thierry Chambolle, Senior Vice president of Suez Lyonnaise des Eaux for Environment and Technology, and Prof. Karl F. Weber, AIT Vice President in his capacity as Acting President, signed the agreement.

The project will be managed by scientific experts from Lyonnaise des Eaux's from its Asia Pacific Technology and Research Network

(ASTRAN). With headquarters in Kuala Lumpur, ASTRAN links five specialised research centres. The main activity of the Kuala Lumpur centre is the management of water resources. The Jakarta and Manila centres specialise in customer services and the distribution of drinking water. The Macau centre specialises in water treatment and analysis, while the Sydney centre focused on wastewater treatment. ASTRAN also has mid to long-term technical partnerships with major educational institutions in these cities and throughout the region.

Ciria—using rainwater and greywater

Water is a precious resource and its conservation is essential. Some of the demand for it can be met by using rainwater and 'greywater'—water that is derived from baths, showers, hand basins and washing machines. In this way, we can: reduce the demand for water of potable quality; cut costs to water companies and their customers; reduce the abstraction of raw water from rivers and the ground; and reduce the demand for new water supply and

New Membrane Process Launched by Leopold

An ultrafiltration membrane process has been developed by Leopold specifically for the water industry.

Ultrabar is a hollow fibre membrane water treatment process, which ensures effective removal of *E. coli*, *Cryptosporidium* and other micro-organisms. Because Ultrabar provides a physical barrier between raw and treated water, it performs at higher removal rates than conventional clarification and filtration treatment processes.

The Ultrabar is designed for a number of different water treatment applications including removing turbidity and micro-organisms from surface water, pretreatment prior to other membrane processes, filter backwash water recovery and ground water protection against water ingress. The hydrophilic polymer membrane is capable of removing particles, viruses and contamination down to 0.01 µm diameter.

Further information:
Steve Morris, Leopold,
tel.: +44 (0)1256
896966; fax: +44
(0)1256 893835.



product and company news

treatment systems.

The purpose of CIRIA's 'Buildings that save water' project is to develop best practice guidance for users, developers, manufacturers and regulators. The project is based on practical demonstrations and monitoring of different systems in different situations, to provide experience and data to support the guidance. Systems will be assessed by the amount of water saved, economics,

water quality and health and safety issues surrounding installation, operation, and maintenance. The project started in February 1998, with the BSRIA and WRc providing expert technical input, guided by a project steering group.

The project will produce best practice guidance—on rainwater, greywater and combined systems, including information on types of system; how to select and install sys-

tems in different building types for different uses; maintenance; legislation; health and safety; water quality; economic and environmental issues.

Further information: Daniel Leggett, Head of Water Group, CIRIA, tel.: +44 (0) 171 222 8891; fax: +44 (0) 171 222 1708; e-mail: daniel.leggett@ciria.org.uk

Mono®Pumps lend a helping hand

Leading progressing cavity pump manufacturer MonoPumps, has donated a number of its Aquadev hand pumps to several of developing countries, in conjunction with the charity WaterAid.

The hand pumps are specially designed to provide cost effective, long term drinking water supplies in developing countries.

The hand pumps will be installed on shallow hand-dug wells to provide a more accessible supply of fresh water. Currently people can spend anything between 3 and 4 hours a day carrying poor quality water, often resulting in water-related illnesses.

The Aquadev pump is designed to meet WaterAid's standards for ease of installation, maintenance and use. Following simple training, the pump can be installed by just two people without the need for lifting gear and special tools, and can deliver up to 1320 L of water per hour at 50 strokes/min from depths up to 45 m. Maintenance is equally straightforward, required only on an annual basis and simplified by the use of interchangeable pump components, which reduces the number of spare parts required.

The Aquadev's extendable T-shaped handle ensures that the same minor amount of effort is required to draw water, regardless of pumping depth. This means that the yield per stroke is maintained, however deep the well, enabling the whole community to use the pump with ease.

The Aquadev hand pump is produced from components which will not corrode, and all moving parts which may wear are produced from plastic or rubber, which can easily be replaced by hand. The pump head is fabricated from corrosion resistant steel. The rising main is made from lightweight plastic and the pump rods from stainless steel.

Its design ensures that the forces within the Aquadev are minimised, thereby reducing the stress on key components and extending its operational life, increasing the reliability of the complete pump.

Further information: Debbie Wharmby, MonoPumps Ltd, tel.: +44 (0) 161 339 9000; fax: +44 (0) 161 21 2146.

