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News update from IWA Executive Director, Paul Reiter

Beijing ... a great city of the past and a great city of the future. I am sure that for many of you attending the 2006 IWA Beijing World Congress, the experience of being in Beijing and in China served as a window into the extraordinary change underway in China. As the Beijing Congress President Vice Minister Qui reminded us, China is adding the equivalent of a New York City every year in urbanized population! The extraordinary transformation underway in the rapidly developing countries such as China and India, and the implication for water, is a challenge that we as the global network for water professionals must be prepared to meet.

By all accounts, the 2006 IWA Beijing World Congress was a great success. Feedback from members indicated that you thought the scientific and technical program was excellent, that the exhibition opened up new frontiers, that the special events of the Congress were enjoyable and that the overall

organization of the Congress was very good. To be sure, there are areas of continuing improvement in our plans, which we will work on with your advice and help.

There were many compliments directed towards the entertainment at the gala dinner in the Great Hall of the People provided courtesy of the sponsorship of the Suez group (the venue and food were provided by the Ministry of Construction). Our thanks to Suez. Our sincere thanks as well to the Principal sponsors Veolia and Beijing Capital, our Sustaining Innovation sponsor Singapore, and to the many other gold, silver and bronze sponsors that really helped to make the event a successful one.

The challenge for the 2008 IWA Vienna's Congress will be to meet and exceed the many successful facets of the Beijing Congress – a challenge that I am sure will be capably met with sophistication and grace under the direction of the 2008 Congress President, Walter



Paul Reiter

Kling of Vienna Water.

Looking ahead, the increasing breadth and quality of IWA's many activities and participants – events, publications and the network – provides a real opportunity for you as water professionals to make a difference in shaping the increasingly challenging task of sustainable water management in advanced, transitional and low income countries around the world. Notable in the landscape over the next two years will be the 2007 IWA Leading Edge Technology Conference in Singapore, a full compliment of over 30 Specialty Conferences in each year, IWA Water Utility Leaders' Forums throughout the world, the introduction of the work of new Specialist Groups in Institutional Governance and Regulation, Water Security and Safety Management, Strategic Asset Management, Climate Change and Adaptation, and Sustainability.

Under the leadership of IWA's new President, Dr David Garman, and the support of a new and diverse Executive Committee, IWA is ready to support our members in their pursuit of a diverse range of interests and activities as we enter into our next biennial cycle leading up to Vienna. As Executive Director, I and the London staff stand ready to provide the daily support that the Association can provide you.



Pre-congress Committee Meetings

In the lead up to the World Water Congress a series of business meetings were held covering key committee's of IWA including the Governing Board. Meetings held over a series of five days included the Executive Committee, IWA Publishing Board, Programme Committee, Outreach, Strategic Council, Governing Board, Young Water Professionals and the Council of Distinguished Water Professionals. The excellent turnout from the IWA membership in anticipation of the Congress meant that all segments could be represented at these important meetings and the result was a series of comprehensive outcomes across the board.

The commitment of volunteers on these committees was very much evident in the Strategic Council meeting on Friday 8 September. A full days session covered a review of the Association's Strategic Plan, analysis of a new strategic initiative in education and training, reports on global task forces (including sanitation, water and health and sustainability), development of IWA reference papers to assist in broadening public knowledge and understanding and finally consideration of the activities of our specialist groups, task groups and conferences.

The Strategic Council met in joint session with the Governing Board that evening which then set the scene for a full day meeting of the Governing Board on Saturday 9 September. The Governing Board comprises representatives of each of the National and Regional Governing members from around the world. The Governing Board meeting is the general meeting of the Association. In addition to consideration of reports on membership, member marketing, finance and conferences the Governing Board was called upon to consider two very important questions: The election and appointment of members to the new Executive Committee; and

Adoption of various governance and legal structure changes for the Association. Each of these is reported separately in this newsletter.

Endorsement was also obtained for IWA's Strategic Plan and its budgetary outlook for the coming years. The 2005 formal Annual Report was also received and a copy of the 2005 Annual Review (the summary document) can be accessed on the IWA website.

<http://www.iwahq.org/uploads/iwa%20hq/website%20files/about%20iwa/Annual%20review%202005-v2%20high%20res.pdf>

To find out more about the outcomes of the Beijing Congress & Exhibition please visit our website at the following link:

http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=649203

Legal Structure and Governance

Following a review by an internally convened Governance Review Task Group, a number of changes were recommended to and adopted by the Governing Board at the Beijing Congress. These changes will assist in ensuring that IWA remains at the forefront of best governance practice with clarity of accountability and responsibility amongst its various committees and a simplification of its constituent documents. These changes codify IWA's existing practices and procedures and will meet the emerging requirements of the UK Charity Commission (the regulator in England where IWA is incorporated).

For the membership there will be no visible change except perhaps in the nomenclature for some of our bodies (the Governing Board is now known as the Governing Assembly and the Executive Committee is now known as the Board of Directors). The background to the legal structure and governance changes together with particulars of the resolutions adopted by the Governing Board are available on the IWA website or by contacting Tom Mollenkopf, Deputy Director tom.mollenkopf@iwahq.org.uk

Congratulations to the new Board of Directors

Following a high level of interest in positions on the IWA Board of Directors (formerly known as the Executive Committee) a number of new faces now appear on the board.

- Following last year's election, Dr David Garman now takes over as President and Professor Laszlo Somlyody becomes the Immediate Past President.
- Dr Glen T Daigger has been elected as Senior Vice President and Professor Schinichiro Ohgaki was elected Vice President. Gerard Payen, the new Chair of the Strategic Council, comes onto the Board of Directors as does Mr. Khoo Teng Chye



Professor Laszlo Somlyody hands over IWA Presidency to Dr David Garman.

and Professor Hamanth Kasan. Incoming Congress President for the Vienna Congress, Mr. Walter Kling also joins the Board.

- Retiring members are Mr. Michael Rouse, Professor Harro Bode, Professor Saburo Matsui, Vice-Minister Qiu Baoxing and Professor Zaini Ujang. Continuing on the Board of Directors are Associate Professor Blanca Jimenez, Mr. Juan Ras, Professor Helmut Kroiss and Professor Mogens Henze.
- Professor Eugene Cloete steps down from the Board but remains as a presidential advisor to the Board of Directors.

Sincere thanks go to the outgoing members of the Board of Directors for their passion and outstanding service over the years. The new Board of Directors will next meet in Vienna in December 2006.

PUB agreement

Singapore PUB signs first ever sustaining innovation partnership with IWA

In a special signing ceremony at the President's Dinner Singapore PUB Chief Executive, Mr. Khoo Teng Chye, and IWA President, Professor Laszlo Somlyody, signed the first ever Sustaining Innovation Partnership.

The partnership memorandum of understanding commits the parties to an ongoing cooperative programme with the objectives of identifying and highlighting innovation and technological advances, water resource management and encouraging adoption of new technology and innovative



Laszlo Somlyody signs the agreement with PUB

practices. The memorandum of understanding builds on a number of recent collaborative efforts including the ASPIRE regional conference in 2005, Utility leaders' meeting and hosting the Young Researchers' conference in 2006. Singapore will also host the 2007 Leading Edge Technology Conference.

Governing Board Meeting Notes

Highlights of the IWA Governing Board Meeting that took place in Beijing, 8 and 9 September 2006

IWA held its annual Governing Board meeting immediately prior to the Congress. This Board meeting was chaired by outgoing IWA

President, Prof Laszlo Somlyody, who has now been succeeded by Dr David Garman (Australia). Here are the key resolutions and outcomes of that meeting:

- The Board elected Dr Glen Daigger (CH2M Hill, US) as senior vice president and Prof Shinichiro Ohgaki (University of Tokyo, Japan) as 2nd vice president

- The financial position of IWA has strengthened over the last two years and there is optimism for a favourable return from the Beijing Congress
- The Board approved the proposed amendment of the legal structure and governance of the Association to integrate the IWA the association with IWA the company; members of the IWA Executive Committee were authorized as Directors and Members of the Company; the role of IWA Governing members was formalized and strengthened as the Governing Assembly
- Planning and preparation is underway for the IWA Congress that will take place in Vienna 2008. Planning has also started for Montreal 2010.
- The Board selected East Asia/ASPIRE as the region of choice for the 2012 Congress



Governing Board Members pose for photos after their meeting.

CEO Meeting Notes

Biggest Ever CEO Meeting Connects Utility Leaders

A feature of recent world congresses has been a CEO forum. The 2006 Congress provided the perfect venue for the biggest and most successful forum to date.

Over 80 participants from every continent came together on the first day of the World Water Congress to discuss some of the top issues confronting the water sector and utilities in particular. The sessions were:

- The Shape of Tomorrow's Utility

- Global Water Sector Reports
- Meeting Water Needs
- Public Sector Issues and Development

The CEO forum in Beijing capped an excellent year for IWA Utilities following on from earlier meetings in Berlin in April 2006 and Singapore in May 2006. Plans are already afoot for forums in Europe and Asia again in 2007 together with a number of IWA Utility conferences in conjunction with various Specialist Groups. Additional details on IWA Utilities can be obtained from Tom Mollenkopf, Deputy Director tom.mollenkopf@iwhq.org.uk



IWA Deputy Director, Tom Mollenkopf MC of the CEO meeting

Press Release: World Water Monitoring Day, October 18th 2006

A whole new generation showed their concern about the quality of their water, as countless students joined thousands of adults in monitoring the health of their local watersheds this week. Monitoring sites spanning approximately 50 countries are expected to again demonstrate that the need for clean water brings universal agreement.

The International Water Association (IWA) and the Water Environment Federation (WEF), together with a host of global partners and sponsors, coordinated World Water Monitoring Day this year. They expect to continue the events leading up to WWMD each year with a goal of reaching one million volunteers by the year 2012. World Water Monitoring Day (WWMD) is an international outreach program that builds public awareness and involvement in protecting

water resources around the world.

Held annually between September 18 and October 18, the program engages communities in monitoring the condition of local rivers, streams, estuaries and other water bodies. Since its inception in 2002, more than 80,000 people have participated in 50 countries.

"The fact so many nations are joining in this important annual outreach demonstrates our interdependence on clean, fresh water as a source of life. No matter who you are, or where you live, clean, pure water is essential for drinking, hygiene, agriculture, commerce and recreation," stated Paul Reiter, IWA Executive Director.

"IWA encourages all who participated this month to adopt a local waterway and report on its

quality year after year. By working together, we intend to create a global core of concerned and action oriented people who will become an important part of our efforts to educate the world's citizens about the critical need for clean water."

WEF will host the main WWMD celebration at Washington DC's Anacostia River today. Ben Grumbles, Assistant Administrator for U.S. EPA's Office of Water, will lead local dignitaries, water quality professionals, environmental groups and local area students in hands-on testing of the river's water quality.

For more information on World Water Monitoring Day 2006, visit the World Water Monitoring Day website www.worldwatermonitoringday.org. You may also check out www.wef.org or www.iwhq.org.uk for related information.

The Project Innovation Awards – Rewarding Innovation

Leading international water organizations were rewarded for their innovative approaches to the challenges of the water industry at a ceremony on 12 September 2006 organized by the International Water Association (IWA). The Project Innovation Awards honours excellence and innovation in water engineering project around the world; it recognises originality in project conception and results, focuses exclusively on engineering and water and builds on national awards to create a set of regional and global awards.

The Awards were presented during the IWA World Water Congress (10-14 September) and included the following categories of award winners: applied research projects; planning projects; design projects; operations /management; and small projects. Paul Reiter, IWA's Executive Director, said of the Award and its winners: "IWA's tagline is 'solutions through innovation'. This ties in very well with the aim of the Awards programme. The awardees recognised this evening are excellent examples of how innovation in technology, management, research and marketing has enabled the water sector to overcome its challenges in water supply."

Dan McCarthy, President and CEO of Black & Veatch Water said on receiving an award for the Tai Po Water Treatment Works, Pumping Stations and Aqueducts, "This is another example of our global technology and practice leaders working closely with experienced project teams and world-class owners to apply the best possible solutions locally".

The full list of 2006 Awardees include:

Superior Achievement Award to:

- CH2M Hill for Alexandria Sanitation Authority (ASA) Advanced Wastewater Treatment Facility Upgrade

Category: Applied Research Projects

Global Grand Prize Winner:

- Poseidon Resources Corporation for Carlsbad Desalination Demonstration Project

Regional Winners:

- Poseidon Resources Corporation for Carlsbad Desalination Demonstration Project
- Malcolm Pirnie, Inc for Watervliet Arsenal Chemical Oxidation Remediation Project
- University of New South Wales for EGOWS for Improved Oil-Water Separation
- Kiwa Water Research for Criticality Analysis of Valve Location and Reliability

Category: Planning

Regional Winner and Global Grand Prize Winner:

- Gold Coast Water for Pimpama Coomera Master Plan

Category: Design Projects

Global Grand Prize Winner

- Black & Veatch for Tai Po Water Treatment Works & Aqueducts, Hong Kong, China

Regional Winners:

- Malcolm Pirnie, Inc for Lee Hall Water Treatment Plant
- CH2M Hill for Alexandria Sanitation Authority (ASA) Advanced Wastewater Treatment Facility Upgrade
- Earth Tech for Eastern Irrigation Scheme



Glen Daigger accepts the Superior Achievement Award on behalf of CH2M Hill from Bill Dee (Chair of the judging panel and President and CEO of Malcolm Pirnie Inc.)

- Black& Veatch for Tai Po Water Treatment Works and Aqueducts, Hong Kong, China

Category: Operations/Management

Global Grand Prize Winner:

- Sinclair Knight Merz for Sydney Water Sewerage Network: Dry Weather Overflow (Sewer Choke) Management Strategy

Regional Winners:

- Sanitation Districts of Los Angeles County for Antelope Valley Green Energy Program: The Power of Innovation
- Sinclair Knight Merz for Sydney Water Sewerage Network: Dry Weather Overflow (Sewer Choke) Management Strategy
- Kiwa Water Research for Prevention of Mechanical Well Clogging; Increasing the Sustainability of Groundwater Abstraction

Category: Small Projects

Regional and Global Grand Prize Winner:

- The City of Salisbury and Kellogg Brown & Root Pty Ltd for Parafield Urban Stormwater Harvesting Facility

The Project Innovation Awards programme will initially run on a two-year cycle with the regional project awards presented in regional forums, and the global project awards being delivered at the biennial IWA Congress. The 2006 Awards were sponsored by Malcolm Pirnie Inc., Black & Veatch Corporation, Sinclair Knight Merz Group and GHD. The Awards were supported by Australian Water Association, VEWIN and the American Academy of Environmental Engineers. Further information at:

http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=640976



IWA staff celebrating the end of a successful Congress & Exhibition in Beijing

60 second interview – Jaime Melo Baptista



Jaime Melo Baptista

President

Portuguese Institute for the Regulation of Water and Solid Waste (IRAR)

Jaime Melo Baptista has been the President of the Portuguese Institute for the Regulation of Water and Solid Waste (IRAR) since 2003. He graduated in Civil Engineering from the Oporto University in 1975 and Specialised in Sanitary Engineering from the New University of Lisbon in 1976. He was the Head of the Sanitary Engineering Division of the Hydraulics Department of the National Laboratory of Civil Engineering (LNEC) between 1984 and 1990 and Head of the Hydraulics Department between 1990 and 2000. He is the author or co-author of more than 250 technical and scientific papers.

What do you consider to be the most significant recent change in your field of expertise to have occurred in the last 10 years?

The most significant recent change in Portugal in my field, which is sanitary engineering and water and waste services regulation, has definitely been the transition from a problem sector to an increasingly modern, professional and skilled one, due to a turnaround in 1993.

Before that date, those services had been under the responsibility of 300 medium/small size municipalities, with poor quality of service in general and difficulty to respond to new challenges. After that year, with the implementation of a new strategy for the sector, we had the opportunity to see the creation of regional bulk water supply systems to complement the local retail ones, the beginning of private participation and an increase in skilled management.

What do you consider to be the most significant future challenge that professionals must deal with in the next 10 years?

We are talking about public essential services, which are vital to the general welfare of the population, public health, economic activities and environment protection. As those services

are a monopoly, there is no natural incentive to increase efficiency, which represents a risk of prevalence of the utilities over the users and of lower quality at higher prices. The most significant future challenge that professionals must deal with is the need to improve efficiency and effectiveness in this complex sector, achieving necessary service quality with the minimum possible costs for the users. Regulation, a State's modern tool aimed at the protection of public interest, has an essential role in reproducing, in a monopoly market, the results expected in a competitive one, thereby creating a kind of 'virtual competitive market'.

Whom do you consider to be the leading expert in your field, outside of your own organization, and why?

It is not easy to single out one or some of my colleagues in this field. I prefer to emphasize the role played on an international level by the American and the English school of water services regulation, creating the opportunity to implement similar strategies in some other countries, like Portugal. In my country, several engineers from the past century, mainly in the fifties, sixties and seventies, are and will be key references in sanitary engineering, as they established the grounds that sustained the huge growth of this sector in the last few decades. We have the responsibility to spread to the next generation that dynamic passed on to us in the recent past.

In what ways would you like to see IWA change in the next 5 years?

Let me say that I have a very positive global opinion of IWA. I have been closely following its activity during the past thirty years, back when there were two different associations. In my opinion IWA is developing outstanding work to the benefit of this sector and trying to connect academics and leading practitioners in the development of both science and practice in the water sector. And this is not an easy task; but positive changes are always appreciated and welcome. A more effective involvement and technology transfer to third world countries and a more effective role in the improvement of their water services could be major future achievements.

IWA must not become the arena only for developed countries and their improvements and successes, with developing countries left out of the scene.

What is your main professional interest...?

My professional interest is the promotion of the necessary tools to support a sustainable and integrated development of the water and waste industry in Portugal, within the present context

of political prominence, availability of important financial resources, opening to the private sector, and transition to a more modern, professional and skilled activity. Nowadays, a remarkable dynamic is taking place, leading to a renewed and updated industry. Every effort to promote the qualification, diversification and organisation of this market is essential, all the more since this industry operates under a natural monopoly and the market behaviour cannot, on its own, ensure the primacy of quality and the public best interest. It is thus imperative to leverage on the present context, so that sustainable development can be guaranteed as soon as possible, by organising the market and promoting quality standards in the sector.

What are the main fracture points and issues of conflict within your specialist area?

Probably the discussion about the best organisational models for this sector that ensure the best results regarding effectiveness and efficiency and the largest economies of scale, scope and process, replacing the usual ideological and sometimes such useless debate between public and private roles.

Forthcoming news of interest...

I expect to see IRAR to move from its current bylaw, still limited and weak in some areas, into a strong regulatory role based on a new bylaw that would assign IRAR the responsibility to regulate all the Portuguese water utilities, reinforce its regulatory powers and ensure its functional and organic autonomy. This would be in line with recent public statements from the Government, the pressure from all the stakeholders and with our personal beliefs. This is an important change for the sector in Portugal and also a huge responsibility for us.

At the international level, I am looking forward to the second edition of the IWA manual, 'Performance indicators for water supply services' in which I had the opportunity to collaborate with Helena Alegre and other European colleagues.

Contact points

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Global sanitation taskforce – Sanitation 21

Sanitation 21: Simple Approaches to Complex Sanitation

The debate around the Millennium Development Goals (MDGs) has thrown into sharp relief the enormous development task which faces the world in reducing poverty. In the run up to the World Summit on Sustainable Development intense lobbying from sector professionals resulted in the inclusion in 2002 of sanitation as a specific MDG target alongside water. This decision reflects the crucial importance of sanitation both in its own right (conferring as it does dignity, privacy, safety and convenience) and its central role in achieving

other goals (health, education and poverty reduction in particular).

However the sanitation challenge remains enormous for a number of reasons not least because:

(1) Coverage of sanitation in urban areas in general is low and even where reported coverage is high the quality of service is often very poor;

(2) the challenge of serving urban populations is growing both because of urbanisation and the increasing degree to which cities and towns are characterised by unplanned and informal settlements (in other words, the real challenges lie in the slums, illegal

settlements, unplanned areas and growing peripheries of cities where 'conventional' approaches to sanitation have demonstrated extremely limited impact); and

(3) The challenge of serving both rural and urban populations is concentrated in the poorest countries that lack the institutions, and particularly the financial means to support either massive public or widespread private/household investment.

Frustratingly much of the investment which is made may be wasted either because sanitation systems fail to reach a significant percentage of people living in the areas they are expected to serve or because management requirements of the installed systems do not match the capacity and resources of the actors expected to manage them and they rapidly fall into disrepair.

During 2006 an IWA-constituted Task Force has been grappling with this challenge. The Task Force has begun to develop an analysis of what is going wrong and how better approaches to sanitation planning could improve the 'quality at entry' of sanitation investments. The Task Force worked through real-life case studies and built on the work of existing groups to identify a framework which could be used to both to analyse a citywide system and also to assess elements within that system; importantly the framework can also be used to identify a development path over time.

The framework addresses some key failings in current approaches which result in a mismatch between the stated objectives of investments and the outcomes. It puts the focus on results – effective and workable sanitation systems which are properly used - based on the real situation on the ground rather than the imposition of pre-selected technologies. It also enables the interests of people engaged in sanitation from the household down to

the city and beyond to be reviewed and balanced. The work of the Task Force is of course only a first step in this process but we hope that the membership of IWA will respond to the challenges which the task force has identified and commit to working towards improved quality of planning and design in urban sanitation systems so that the commitments made at the Millennium Summit can be met.

For further information, contact Darren Saywell (darren.saywell@iwahq.org.uk) or download and read the full report at: http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=639578



Young Water Professional Programme



8th National UK Young Water Professionals Conference

18-20 April 2007, University of Surrey, Guildford, UK

The 8th IWA UK National Young Water Professionals Conference will be held in Surrey in 2007. The Young Water Professionals Conference series aim to provide a forum for

young researchers and professionals working in the water industry to network with their peers and discuss current and future water management issues. In addition to formal presentations and posters, the UK National Conference in 2007 will include a workshop with water industry professionals to discuss water career opportunities.

Papers and posters on all aspects of the Water Cycle, including water and wastewater research, technology and management are invited. The conference is open to young water professionals including students, recent graduates and other professionals under the age of 35.

Email: k.charles@surrey.ac.uk

Website: <http://www.iwa-ywp.org.uk>

2nd National German Young Water Professional Conference

4-6 June 2007, Berlin, Germany

The 2nd IWA German National Young Water Professionals Conference in Germany will provide a forum for young researchers and professionals working in the membrane sector of the wastewater industry to present their work and meet their peers. The conference will consist of formal presentation of papers and posters, and an exchange with water industry professionals providing information on water career opportunities in Germany. This event is an initiative of "MBR-Network", the European cluster on the membrane bioreactor technology, gathering about 50 European and international companies and institutions within the four FP6 projects Amedeus, Eurombra, MBR-Train and Puratreat.

Proposed Themes:

- Tertiary micro- or ultra-filtration

- Membrane activated sludge process
- Anaerobic membrane reactor
- Nanofiltration and reverse osmosis
- Hybrid systems
- Operational experience and optimisation
- Design and performances of biological process
- Fouling, cleaning
- Modelling
- Decentralised membrane systems
- Novel technologies and concepts

The conference is open to all German and international young water professionals including students, recent graduates and other professionals under the age of 35 practicing in the Germany.

Email: iwa@kompetenz-wasser.de

Website: www.kompetenz-wasser.de/iwa

IWA Specialist Groups

Specialist Groups form the basis of IWA and are important vehicles for all "water people" interested in interactions on scientific, technical and management topics throughout the world. The groups, formed as coalitions of individuals around subjects of common interest, provide a sound structure of networks for international specialists to share knowledge, information, skills, and make good professional and business contacts.

It has become a tradition for the IWA Specialist Groups to have individual 'Open Meetings' at the IWA Biennial Congress and this year was no exception, with around 30 meetings taking place over three days. These meetings provided a rare opportunity for the Management Committee and Group members to exchange and discuss past and future activities and engage new people into joining the group.

For a full list of IWA's specialist groups, their objectives, activities and open meeting minutes, please view the IWA website - <http://www.iwahq.org.uk/template.cfm?name=groups>.

To take advantage of this networking opportunity, and become a member of any specialist group (or change your group membership) simply



Ex-Chair, Bo Jacobsen chairing his last open meeting for Specialist Group Assessment Control of Hazardous Substances in Water.

contact the IWA membership department (members@iwahq.org.uk) and tell us which groups you would like to join.

This issue of the newsletter features the activities of seven IWA Specialist Groups active in the research and practice of Waste Water Treatment:

- Chemical Industries
- Ecological Sanitation
- Forest Industry
- Pre-treatment of Industrial Wastewaters
- Wastewater Treatment Systems Utilizing Submarine Outfalls
- Waste Stabilisation Ponds
- Use of Macrophytes in Water Pollution Control

Chemical Industries



The group seeks to identify water pollution problem areas and defines technologies for solutions; a clearinghouse for technical information worldwide on industrial waste management including the chemical and petrochemical wastes. The group holds regular conferences at two or three yearly intervals and session within the biennial conference.

The last conferences organised by the group was on Sustainable Development and Production for Chemical Industries with the Environment (Chemical Industries 2005): Waste and Wastewater Management, Tsukuba & Kashima, Japan, July 14-16, 2005, where the

group were Co-sponsor with SG Assessment and Control of Hazardous Substances in Water.

Chemical Industries face a new challenge regarding sustainable development and production with environmental compatibility. Sound management of toxic chemicals is one of the major global concerns for chemical industries. Therefore there is great importance for this specialist Group. The current Chair Dr Andrew J. Englande is to step down from the position, having served a successful tenure of leading the group. A new management Committee is in the process of being formed and a new Chair elected. Based on outstanding past and on-going contributions to the specialist group, it has been recommended that Darren Sun (Singapore), Pierre Le Cloirec (France), German Buitron (Mexico), Carmen Guarino (USA), Torleiv Blistad (Norway) Professor Matsui (Japan) and/or Prof. Matsuda (Japan) to be appointed. This Management Committee will function to provide guidance and support to the rest of the Specialist Group.

Future Activities of the group includes:

- Co-Sponsor of 'Micropol & Ecohazard 2007' 5th IWA Specialised Conference on

Assessment and Control of Micropollutants/Hazardous Substances in Water, 17-20 June 2007, Frankfurt, Germany. For more information please see: http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=642692

- Selection of a new Management Committee.
- Election of a new Chair

For more information on the group please view the group's webpage at:

http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=633918

or contact the Chair: Prof A. J. Englande Jr, E-mail: aenglan@tulane.edu and/or Secretary: Dr Torleiv Bilstad, Email: torleiv.bilstad@uis.no

Ecological Sanitation

The EcoSan group focuses upon sustainable sanitation systems enabling nutrient and water reuse, mainly by source separation. The full range from high- over medium- to low-tech and from decentralised to centralised solutions is covered. With regard to current practice in sanitation there is a need for more options to address the requirements for the diverse geographical and socio-economic conditions around the world. There is a dramatic need for safe and cost efficient sanitation in un- and underserved areas and the ambitious MDGs (Millennium Development Goals) can probably only be met if the profession takes up new tools.

Despite a lot of discussion on an alternative term for 'Ecological Sanitation' or Ecosan we still use this name. Our alternative 'Resources Management Sanitation' as suggested two years back in Marrakech was not used much. Suggestions still welcome. On the other hand Ecosan is used a lot more now and the number of projects under this name is growing very fast. Unfortunately there are still relatively few projects



where the water profession is involved. There is a huge demand for innovative solutions for far over two billion people, but there is very little research done especially on low-tech Ecosan.

Luckily, IWA Headquarters (with Darren Saywell) and some Ecosan SG members are involved in the EU 6th framework project NETSSAF, a capacity building program with the goal of large scale implementation of sustainable sanitation solutions in West Africa. Several Ecosan SG members are also involved in the EU 6th framework project ROSA that focuses on capacity building and implementation of EcoSan systems for peri-urban areas in 4 cities in East Africa. Otherwise members of IWA still tend to work rather on high-tech Ecosan, where the number of projects has also increased.

The good news is that there are some large utilities and companies involved in this field now. The Ecosan SG had a group meeting in Beijing and it was announced that the newsletter of the SG has been coupled to the GTZ Ecosan Newsletter available at <http://www.gtz.de/en/themen/umwelt-infrastruktur/wasser/9403.htm> which reaches out to more than 10'000 subscribers.

The next major Ecosan event is in Aachen, Germany in March 2007 with the conference 'Advanced Sanitation', in which the next Specialist group meeting will also take place. For more information on this conference please view the website at: http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=641945.

For more information on the group please see the group's page at: <http://www.iwahq.org.uk/template.cfm?name=sg52> or contact Ralf Otterpohl, chair; otterpohl@tuhh.de, Håkan Jönsson, co-chair; Hakan.Jonsson@lt.slu.se Günter Langergraber, co-chair; Email Guenther.Langergraber@boku.ac.at

Forest Industry

The group contributes to the development of environmental issues within the forest industry, from the perspective of water. In order to achieve its objectives, the group organises symposia and workshops, publishes a newsletter and proceeds to maintain a homepage/discussion forum under IWA main pages on the website.

In April 2006, the 8th IWA Symposium on Forest Industry Wastewaters symposium was held for the first time in South America, in Vitoria, Brazil, the hot spot of virgin fiber production and development. Under the fresh leadership of Professor Claudio Mudado Silva in cooperation with the 6th International Conference on Fate and Effects of Pulp and Paper Mill Effluents chaired by Dr. Tatiana Heid-Furley, we witnessed the smooth union of these two conference series. The excellent organization behind the whole event was the Brazilian Technical Pulp and Paper Association (ABTCP). The well-reasoned wish for the union of these conference series was seriously expressed at the

1996 symposium in Vancouver, the first joint event occurred in Seattle, USA, in 2003 through the fruitful cooperation of Professor John Ferguson and Dr. Timothy J. Hall.

Antero Luonsi has stepped down as Chair; he has been involved in the organizing of the IWA Symposia on Forest Industry Wastewaters since their beginning in 1984, and more recently for his chairing of the IWA Specialist Group. Under his leadership we have seen a closer alliance between the IWA Symposia and the 'Fate and Effects Conference', which has resulted in enhanced value for participants in the past two joint conferences held in Seattle and Vitoria. We would like to thank Antero, for all his hard work. Taking over the Chairmanship of the Specialist Group is Michael Paice who has 30 years experience in the pulp and Paper Industry; we congratulate Michael and welcome him to the position.

This year the group has achieved in expanding the management committee to cover all continents (four European representatives, three North Americans, two South Americans, one each from Africa and Asia), a balanced basis has been provided for the future of the Specialist Group and the events. The next Symposium will be in Montreal in June 2009.

For more information on the group please see the group's page at: http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=633924 or contact the Chair: Michael Paice, Email: mpaice@paprican.ca

Pretreatment of Industrial Wastewaters

This group covers strategic aspects of Pretreatment programmes (technical, administrative, fiscal); impact of industrial discharges on municipal treatment works; characterisation and categorisation of industrial wastewaters; end of the pipe treatment technologies; in plant technologies; recycle, material recovery and waste minimisation; treatment and disposal of toxic sludges.

During the last years the activity of the Group decreased dramatically but this is starting to change when in March 2006 the group elected new Leadership positions and formed a new Management Committee. Please see below for details:

- Chairperson position: Prof. Maria Loizidou, Greece
- Vice-Chairperson: Kenneth N. Wood; USA
- Secretary position: Dr Ioannis E. Alexiou; UK
- Events Coordinator position: Prof. Ülkü Yetis; Turkey
- Newsletter Editor/Moderator: Noha Gaber; USA

Management Committee Members:

- Mitchell Laginestra; Australia
- Dr Dionisis Mantzavinos; Greece;

- Dr. Ján Dercó; Slovak Republic;
- Devrim Kaya ; Turkey;
- Prof. Andreas Andreadakis; Greece

Future activities for the Specialist Group include:

- Producing newsletters informing members of activities and developments within the group
- Organizing conferences / workshops
- Initiated research papers and investigations
- Hold Group meeting(s).

For more information about the Pretreatment Specialist Group, please view the group's webpage at:

http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=633930

If you are interested in becoming active in this group, have suggestions for future activities, or are willing to help organise a conference/workshop on this topic, please contact Frances Lucraft at frances.lucraft@iwahq.org and/or Chair/Secretary of the group Prof. Maria Loizidou Email: mloiz@orfeas.chemeng.ntua.gr, Vice-chair Kenneth N. Wood Email: kenneth.n.wood@usa.dupont.com, Secretary Dr Ioannis E. Alexiou, Email: mpampakas@hotmail.com

Use of Macrophytes in Water Pollution Control

This group sets out to:

- Act as a link between scientists working on the scientific and technical aspects of the use of macrophytes in wetland systems (Constructed Wetlands, Reed Beds, Treatment Wetlands and converted natural wetlands) for water pollution control and resource recovery;
- Contribute to co-ordinating research activities, defining research needs and promoting the exchange of results;
- Develop a commonly-accepted model on the functioning of macrophyte-based wastewater



treatment systems and produce guidelines;

- Establish standardised guidelines for reporting performance of macrophyte-based wastewater treatment systems.

The Group's 10th Biennial Conference on Wetland Systems for Water Pollution Control took place in Lisbon, Portugal from 23 to 29 September 2006 www.wetconf10.adp.pt. Constructed wetlands are considered low-cost alternatives for treating municipal, industrial and agricultural effluents. A vast amount of literature has been published on various topics including potential use of these systems to remove biochemical oxygen demand, nutrients and to a limited extent metals and toxic organic compounds; engineering assessment and design criteria; and optimization and cost-effectiveness.

The Conference was an international meeting point for scientists, engineers, managers, and entrepreneurs, providing an opportunity to review and assess research and management practices on natural and constructed wetlands, aimed at improving natural dynamic processes and pollution control, in particular planning, operation, performance, and economics of wetland systems. The conference included invited presentations by an outstanding array of experts and presentations describing research conducted on various treatment wetlands throughout the world. There were also conference field trips which include visits to constructed wetlands in Portugal. At the group Members' Meeting during the Lisbon conference the 11TH Biennial conference was awarded to India in autumn 2008. The organizer is Prof Suresh Billore of Vikram University in Ujjain but the conference will be held in the nearby city of Indore.

Besides Organising conferences, the group produces a Group Newsletter (approximately every 6 months), which has now been running for 16 years and has now reached Issue No 31. Paul Cooper has stepped down as the group's Secretary, after dedicating 15 years to the group. Thank you Paul, for a job well done! Taking over the position of the Specialist Group is Dr Jan Vymazal from the Czech Republic; we congratulate Jan and welcome him to the position.

For more information on the group see the group's page on internet on at: http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=633933 or contact the Chair: Prof. Raimund Haberl, Email: Raimund.Haberl@boku.ac.at and/or Secretary: Dr Jan Vymazal, Email: vymazal@yahoo.com

Waste Stabilisation Ponds

This group aims to promote the use of waste stabilisation ponds for wastewater treatment in both industrialised and developing countries; coordinate studies on the performance of full-scale and pilot-scale waste stabilisation ponds for municipal, agricultural and industrial wastewater treatment; exchange information and develop international technology



transfer mechanisms; and identify research needs for the future development of ponds systems.

For the first time in Asia, the group has recently held the 7th International Conference on Waste Stabilization on Ponds which took place on the 25-27 September, Bangkok, Thailand. This conference was an international forum for the exchange of information on waste stabilization ponds and associated technologies. Attendees were specialists from all aspects of the industry including design engineers, environmental scientists, researchers and regulatory personnel. Ponds along with other natural treatment systems, such as wetlands, are gradually regaining popularity and acknowledged as a high potential wastewater treatment option of the future due to their capacity to enhance biodiversity and aesthetic value of the environment. This event provided a unique opportunity for both local and international delegates to acquaint themselves with the latest research and interact with experts in the field. This conference has followed on from the past six conferences which have taken place since 1987 on all other continents. It was co-organized by IWA and Asian Institute of Technology (AIT), well known for its role in promoting environmental friendliness and decades of pond-related research.

For more information on the group see the group's page on internet on at: http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=633934 or contact the Chair: Dr Andy Shilton, Email: A.N.Shilton@massey.ac.nz Secretary: Professor Bouchaib El Hamouri, Email: b.elhamouri@iav.ac.ma

Wastewater Treatment Systems Utilizing Submarine Outfalls

The statistics on the world's water problems are sobering. Of the world's six billion inhabitants, one quarter has no access to safe drinking water, and one third, some 2 billion people, have no adequate disposal of their wastewater, not to speak of wastewater treatment. The problems are perhaps most severe in coastal regions.

The relatively low cost and reliability of ocean outfalls can provide an effective solution

to wastewater disposal in coastal areas with little environmental impact. This is becoming even more important given the great sanitation needs of the world, particularly in view of the rapidly increasing numbers of people living near coastlines. Implementation of an outfall project can be a complex task that is often controversial, however. The purpose of this specialist group is to advance the science and technology of marine wastewater disposal and to facilitate communication between practitioners and other stakeholders in the field. The group recognizes the considerable potential for wastewater treatment systems that utilize the natural receiving capacity of marine waters. The design of submarine outfalls depends on many disciplines, including oceanography, marine sciences and biology, civil and environmental engineering, construction, economics, and public relations. These diverse disciplines are rarely brought together in a single group.

The Specialist group decided to combine their conferences and meetings with the MWW International Conferences on Marine Waste Water Discharges and Coastal Environment. Since 2000, these bi-annual MWW conferences have enabled their outfall community to meet periodically; the last was held in Catania, Italy Sept. 27 - Oct. 2, 2004. This successful conference was attended by 148 delegates. Carlo Avanzini, member of the Managing Committee, has organized the next conference, MWW 2006, which will be held in Antalya, Turkey, 06-10 November 2006 (instead of Santander, Spain as originally planned). This conference will be co-sponsored by IWA, as have been the preceding ones. For more information on this conference and a chance to register, please view

http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=634876

For more information on the group see the group's page on internet on at: <http://www.iwahq.org.uk/template.cfm?name=sg15?>

or contact the Chair: Philip Roberts, Email: proberts@ce.gatech.edu

MEMBERSHIP NEWS

It's time to renew!

We'd like to take this opportunity to thank you all for your support and involvement in IWA during 2006. We hope that you have found your membership valuable.

It is now time to renew your membership for 2007 and you should by now have received your

membership renewal invoice. Individual members have the option to either pay the renewal invoice as instructed or you can renew your membership online at: www.iwahq.org. IWA would like to encourage our members to renew before the New Year, in order to avoid any delay in receiving their member benefits!

If you have any questions about renewing your membership please contact us at: iwamembership@portland-services.com quoting your membership number in the subject line of the email.

We look forward to continued collaboration with you in 2007!

Recruit-a-Member Competition



The International Water Association is a global network of water professionals, spanning the continuum between research and practice and covering all facets of the water cycle. Through IWA, its members collaborate to promote the development and implementation of innovative and effective approaches to water management.

One of IWA's goals is to promote the exchange of ideas and knowledge about breakthroughs and developments amongst its global membership.

We see our members as valuable ambassadors who can raise awareness of the IWA amongst their own peers and colleagues.

On 1 October 2006 we launched a Recruit-a-Member competition for all IWA Individual members to raise the profile of IWA throughout the world through our own members.

If you recruit a new member between 1 October 2006 and 31 December 2006 you will have the chance to win a £150 voucher which can redeemed on either your membership fees or on an IWA event registration. Plus your newly recruited colleagues will receive 3 months free membership.

There will be one £150 prize voucher for the person who recruits the most members by the end of December 2006, and a second special prize draw so that anyone who enters the competition could win!

Full details of the competition can be found on the IWA website (www.iwahq.org)

IWA Staff update

Staff changes at IWA Headquarters:

The head office team was boosted in August by the appointment of James Shearring as Webmaster and IT Administrator. James will be focusing on managing the membership database and the organisation's Knowledge Network (Intranet & Extranet); managing the organisation's IT systems & hardware and managing information on the organisation's website.



Making the most of IWA

How can I pay for my IWA membership?

Payment for your membership can be made in the following ways:

- Bank Transfer - Make payment to Portland Customer Services, Natwest Bank Plc, 25 High Street, Colchester, CO1 1DG, UK – Account # 01863630 – Sort Code: 60-06-06.

Please include full name and reason for transfer, i.e. 'IWA membership' and supply us with details of your date of transfer, amount and bank from which it is coming.

- Cheque or Postal Order - Please make cheque payable to 'Portland Customer Services'
- Credit Card Payment

Please note that payment should be made in £-Sterling, US\$ or Euros. Please ensure that your payment includes ALL bank charges. Use your membership number or full name as reference for the payment.

If you have any queries regarding your payment, please contact Portland Customer Services at Sales@portlandpress.com



International
Water Association

Governing Members Premium Payments

The Japanese National Committee has generously contributed to the IWA Connections scheme with a contribution of 10,000 Pounds Sterling, joining the donations which came previously from the Governing Members of France, Switzerland and Italy.

Upcoming Events

Integrated Water Resources Management & Decentralised Systems Conference

10-15 March 2007, Baltimore, Maryland, USA

The International program will provide sessions on accepted and new methods to achieving sustainability. New ideas, research findings, and case studies will be included. Some of the innovative programs currently underway world-wide to be featured at the conference include:

- Green Building Ratings
- Urban Drainage Modeling
- Eco-Sanitation
- Managed Reuse in Commercial Buildings
- Roof Garden and Landscaping Ordinances
- Biomimicry Research

It is the hope of NOWRA and the International Water Association that the knowledge shared and generated at this conference will stimulate action among policy officials, planners, educators, regulators, businesses, engineers, public administrators, and developers for the changes necessary for a sustainable, clean water future – Water for all Life.

Email: nowra@hanifin.com

Website: www.nowra.org

7th International IWA Symposium on Systems Analysis & Integrated Assessment

7-9 May 2007, Washington DC, USA

The Watermatex series of symposia aims to address all aspects of the formal methods of applying systems analysis to managing the quality of the aquatic environment (drinking and waste water, surface and groundwater, technical and natural systems).

The proposed subjects, among others, are:

- Systems Analysis
- Analysis of Uncertainty
- Control
- Software Engineering
- Data Quality Assessment
- Cyberinfrastructure
- Data Assimilation
- Mathematical Programming
- Decision Support
- Risk Assessment
- Environmental Observatories
- Bayesian Belief Networks

Email: watermatex2007@modelEAU.org

Website: www.watermatex2007.org

Leading Edge Conference on Strategic Asset Management 2007

17-19 October 2007, Lisbon, Portugal



Water and Wastewater companies operating all around the world have faced rising asset management and replacement costs, often to levels that are financially unsustainable.

LESAM 2007 will provide an opportunity to discuss developments at the leading-edge in these and other fields to an audience of utility operators and managers, regulators and consultants. It will be focused on the techniques, technologies and management approaches aiming at optimising the investment in infrastructure while achieving demanded customer service standards.

The subject of LESAM 2007 is Strategic Asset Management of Water and Wastewater Infrastructure. The topics within the subject are:

- Global approaches to asset management
- Target definition and assessment of performance
- Cost and benefit valuation
- Target definition and assessment of risks
- Asset data and information systems
- Engineering developments
- Institutional and organisational aspects
- Financial management
- Social and economical dimensions

E-mail: lesam@lesam2007.org

Website: www.lesam2007.org

Efficient 2007

20-23 May 2007. Jeju island, Korea

The objective of the 4th international conference of efficient use and management of water in urban areas is to provide a forum for the exchange of the most recent ideas, techniques and experiences in all areas of water management that could contribute to more sustainable use of water. Professionals from

around the world such as water should attend to Efficient 2007. In this occasion, Efficient will approach to the East providing the participation of professionals around Asia and the Pacific area.

Among others, the proposed themes are:

- Governance Models for efficient utility management
- Institutional, Economics, Regulation & Efficiency
- Water Use and Demand Forecasting
- Water Losses Management
- Pricing of Water Services
- System Planning and Management
- Drought and Emergency Supply Management
- Efficiency in Resources Management
- The Connection between Efficiency and Water Quality
- Flood Management
- Water Reuse and Recycling
- Efficiency in Low-Income countries
- Practical Experiences within the planning and Efficient Management

The conference will take place in Jeju, which is a world-class resort island situated off the southern tip of the Korean Peninsula where the North Pacific meets the Yellow sea.

Email: secretariat@efficient2007.com

Website: www.efficient2007.com

DEADLINES

15 November 2006 for submission of abstracts for the 4th IWA Leading-edge Conference on Water & Wastewater Technologies (4-7 June 2007, Singapore, Singapore)

Contact: info@iwa-let2007.com.sg

1 December 2006 for submission of abstracts for Sequencing Batch Reactor Technology (7-10 April 2008, Rome, Italy)

Contact: sbr4abstract@irsa.cnr.it

1 December 2006 for submission of abstracts for IWA conference on water management & technologies applications for developing countries 2007 (14-16 May 2007, Kuala Lumpur, Malaysia)

Contact: arasi@malaysianwater.org.my

News from IWA Publishing – www.iwapublishing.com

We are delighted to bring you news of SIX NEW BOOKS from IWA Publishing:

* Coagulation and Flocculation in Water and Wastewater Treatment *

Second Edition



Author: John Bratby

Coagulation and Flocculation in Water and Wastewater Treatment provides a comprehensive account of coagulation and flocculation techniques and technologies in a single volume covering theoretical principles to practical applications.

Thoroughly revised and updated since the 1st Edition it has been progressively modified and increased in scope to cater for the requirements of practitioners involved with water and wastewater treatment

ISBN: 1843391066 · October 2006 · 450 pages · Hardback

IWA Members Price: £60.00 / US\$120.00 / €90.00

* Integrated Water Meter Management *

Authors: J F Arregui, E Cabrera Jr, R Cobacho



Water meters are the cornerstone of commercial systems for water utilities throughout the world; revenue is directly derived from the, figures provided by meters. Despite this, little attention has been paid, in terms of selection, replacement period and return on investment, to the management and optimization of water meters. Integrated

Water Meter Management is an invaluable resource for those involved in urban water management, including water utility managers, engineering technical staff, operations and maintenance specialists, meter-reading personnel and scientific researchers in this discipline.

ISBN: 1843390345 · November 2006 · 274 pages · Hardback

IWA Members Price: £60.00 / US\$120.00 / €90.00

* Identification and Control of Filamentous Micro-organisms in Industrial Wastewater Treatment Plants *

Multi-Media Training CD

Author: Dick Eikelboom



Identification and Control of Filamentous Micro-organisms in Industrial Wastewater Treatment Plants presents completely new information on filamentous populations, responsible for poor settling sludge (bulking) in industrial wastewater treatment plants (WTPs). The results presented are based on a six-year EU-sponsored research program carried out by a consortium comprising Dutch (Bioclear and TNO), Italian (CNR), Danish (TU Aalborg) and German (Vermicon) partners. The research program included approximately 200 treatment plants, covering a wide range of industrial sectors. Over 120 minutes of audio recording is supported by extensive photographs, videos, animations and tables with over 1,000 illustrations.

ISBN: 1843390965 · July 2006 · Electronic Product

To order this publication please contact our distributor, Portland Customer Services.

* Computational Methods in the Management of Hydro-Environmental Systems *



Authors: V Nassehi, DB Das

This book provides concise, up-to-date and easy-to-follow information on an increasingly important area of hydro-environmental analysis and management. It covers important aspects of both surface and subsurface water quality management, as they are inseparable components of aquifers and the flow in physical domains occur in combination with the other. However, the main emphasis of the book is on the practical development and application of computer based algorithms, via appropriate schemes, to realistic problems.

ISBN: 1843390450 · November 2006 · 288 pages · Hardback

IWA Members Price: £60.00 / US\$120.00 / €90.00

* CARE-S *

Computer Aided Rehabilitation of Sewer and Storm Water Networks



Editor: Sveinung Saegrov

CARE-S presents the result of an extensive EU project, Computer Aided Rehabilitation of Sewer and Storm Water Networks. The projects developed a complete management system for sewer and storm water assets, including methods and software. It comprises methods and models for the three levels necessary of management, namely the long-term planning, the project ranking and the technology selection. The results of a comprehensive testing of CARE-S in representative European cities are also included in the book.

ISBN: 1843391155 · August 2006 · 160 pages · Paperback

IWA Members Price: £45.00 / US\$90.00 / €67.50

* Human Pharmaceuticals, Hormones and Fragrances *

The Challenge of Micropollutants in Urban Water Management



Editors: Thomas Ternes, Adriano Joss

Human Pharmaceuticals, Hormones and Fragrances provides an overview of the occurrence, analytics, removal and environmental risk of pharmaceuticals and personal care products in wastewater, surface water and drinking water. The book covers all aspects of the fate and removal of PPCPs in the whole water cycle: consumption and occurrence, analytical methods, the legal background, environmental risk assessment, human and animal toxicology, source control options, wastewater and drinking water treatment as well as indirect reuse.

ISBN: 1843390930 · August 2006 · 468 pages · Hardback

IWA Members Price: £67.50 / US\$135.00 / €101.25

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