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8th Annual
RecycleWater2015
NATIONAL WATER RECYCLING & REUSE TECHNOLOGY 2015 CONFERENCE

30th September- 1st October, Bayview Eden Melbourne

Hear About Latest Technology Developments, Innovations & Case Studies in Water Recycling

Conference Chair:
Dr. John C Radcliffe
AM, FTSE Honorary Research Fellow, CSIRO

Hear From Industry Experts:

Dr John C Radcliffe
AM, FTSE Honorary Research Fellow, CSIRO

Denis Bilodeau
First Vice President, Orange County Water District

Dr Petra Reeve
Wastewater Scientist, Australian Water Quality Centre
SA Water Corporation

Dr Stuart Khan
UNSW

Charles Agnew
Program Lead Water Resources at Sydney Water

Pierre Le-Clech
Associate Professor, UNESCO Centre for Membrane Science and Technology, UNSW Australia

Yunal Kumar
Process Engineer, South East Water

Iouri Vaisman
MD Iouriv Water Solutions Pty Ltd

Karen Shaw
Municipal Client Manager, Veolia

Bernice Chapman
PhD, ADI Systems Asia Pacific

Dr Joanne Vanderzalm
Team Leader, Land & Water, CSIRO

Prof. Mikel Duke
Principal Research Fellow, Institute for Sustainability and Innovation (ISI), Victoria University

Jeremy Cheesman
Director, Marsden Jacob Associates

Michael Short
Research Fellow, University of South Australia

Kathryn Linge
Senior Research Fellow, Curtin University

Professor Ana Deletic
Director, Monash Water for Liveability, Monash University

Nicholas Olsson
Australian Vinlys Corporation Pty Ltd

Kathryn Linge, Senior Research Fellow Curtin University

- Future directions for recycling in Australia: where will we be in 2030?
- Recycling developments in China, Korea and Japan- Case studies
- The economics of water recycling and water services
- Policy settings, regulatory frameworks and recycled water schemes
- Meeting the challenges in applying the Australian guidelines for water recycling
- Industrial water recycling opportunities- Case Studies
- Remote & regional water reuse schemes- Case Studies

- Indirect Potable recycling system by replenishing groundwater with recycled water- Case Study
- Success in gaining public acceptance for the use of recycled water
- Aquifer Storage and recharge project- Case study
- Demonstrating the benefits of potable recycling
- Water recycling in food production and manufacture
- Water Reuse and Disinfection
- Building robust business cases for water recycling schemes

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**Recycling developments in China, Korea and Japan**

- Changed wastewater structures
- Improving source control
- The increasing role of MBR
- Integrated Intelligent Satellite Systems
- Resource recovery
- Energy efficiency
- Capital investment decision-making
- The Business Plan
- Consumer expectations

**WATER RECYCLING SUCCESS STORY - OCWD**

**DIRECT POTABLE REUSE (DPR)**

- There is growing interest in direct potable reuse (DPR) around the world
- A quantitative understanding of treatment performance is essential
- Treatment performance must include measures of variability and reliability
- Performance validation is essential for project assessment and regulation
- Key outcomes of Australian and US-funded research will be presented.

**Panel Discussion:**

**RECENT DEVELOPMENTS IN WATER RECYCLING**

- Two examples of how the world-class water recycling and integrated water cycle management work developed in Singapore for the NEWater programme are being adapted and translated to the India context will be used. Delhi, a city of some 18 million people in India is about to implement their first large-scale drinking water reuse project. Another Indian city, Bengaluru is also in the advanced stages of implementing their first drinking water reuse project.
- The strategic planning, public education and acceptance, treatment process selection and project delivery aspects will be highlighted. How such approaches to integrated water cycled management are being or can be applied to Australian cities and circumstances will also be raised.

**Case Study:**

**POTABLE REUSE IN THE ASIA PACIFIC REGION TO ADDRESS RAPID URBANISATION AND INCREASING WATER DEMAND**

- Identifying new and sustainable water resources to satisfy the challenging needs of this region are explored by using the lessons and experiences of recent project work from Australia, India and Singapore
- Examples of how cities are addressing or planning to meet their current and future shortfalls in supply and demand for drinking water, and provision of sanitation services are provided to argue the case for continued and greater investment in the planning and delivery of such crucial infrastructure.

**Case Study:**

**WATER RECYCLING IN SYDNEY**

**Case Study:**

**WATER RECYCLING IN FOOD PRODUCTION**

- Anaerobic digestion of dairy wastewater produces biogas, a renewable source of energy. However to recycle water additional treatment is required.
- An onsite pilot trial demonstrated that a membrane bioreactor (MBR) coupled with reverse osmosis (RO) and ultraviolet and chlorine disinfection, delivered a high quality potable water from anaerobic effluent.
- The MBR achieved 97% COD and 95% nitrogen removal, producing permeate suitable for direct treatment in the RO.
- The trial indicated that up to 70% of the water could be recovered, and the system achieved all potable water criteria.

**Panel Discussion:**

**PERSPECTIVES ON WATER REUSE & RECYCLING – WHAT’S ARE THE LEADING ISSUE FACING THE WATER SECTOR TODAY?**

- The strategic planning, public education and acceptance, treatment process selection and project delivery aspects will be highlighted.
- How such approaches to integrated water cycled management are being or can be applied to Australian cities and circumstances will also be raised.

**Case Study:**

**OCWD Programs & Projects Overview**

- A Tale of Two Agencies and their Quest to Recycle Orange County’s Resource
- OCWD Programs & Projects Overview

**WATER RECYCLING IN AUSTRALIA AND ASIA – WHAT ARE THE CHANGES?**

**INTÉGRER WATER MANAGEMENT & FUTURE OF WATER RECYCLING IN SYDNEY**

- Demand risk in recycled water investment
- The potential for decentralised systems to service growth
- Opportunities to overcome funding and pricing barriers
- Moving beyond reactive drought response to proactive resilience
- The role of water recycling in managing supply and demand cost effectively
- Customer insights and engagement around different end uses

**Case Study:**

**DARLING QUARTER REUSE SCHEME – A REAL SUCCESS STORY**

Darling Quarter was the first private reuse scheme in Australia to go into operation under the WICA licence regime and it is a real success story. There were several challenges we overcome during design and construction and a few clever touches to the design which will be shared in this case study presentation.

**Case Study:**

**FOR WATER RECYCLING IN DAIRIES – DEMONSTRATION OF A MEMBRANE BIOREACTOR AND REVERSE OSMOSIS SYSTEM**

- Anaerobic digestion of dairy wastewater produces biogas, a renewable source of energy. However to recycle water additional treatment is required.
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STORMWATER HARVESTING TECHNOLOGIES

9:30 HOW TO BETTER USE STORMWATER IN AUSTRALIA

- Development of stormwater technologies
- Development of economic models to better understand the total community cost and benefits of complex stormwater systems
- More sophisticated governance frameworks for Managing multifunctional and decentralised stormwater assets
- Better linkage between stormwater management and urban planning process

Prof Ana Deletic, FTSE, Director of Monash Water for Liveability, Monash University

STORMWATER THREAD OR RE SOURCE?

10:00 CAPTURING THE POTENTIAL OF STORM WATER - FOUR THEMES

- Introduction: Storm water - threat or resource?
- Theme 1 Stormwater Harvesting Guidelines
- Theme 2 Performance assessment for stormwater treatment devices
- Theme 3 Operation & Maintenance
- Theme 4 Delivery mechanism and contract choice

Jouri Vaisman, MD Jouri Water Solutions Pty Ltd

Case Study | MANAGED AQUIFER RECHARGE

11.00 MANAGED AQUIFER RECHARGE (MAR) WITH RECYCLED WATER

- Case studies of various MAR techniques including Soil Aquifer Treatment (SAT), infiltration galleries, aquifer storage and recovery (ASR), aquifer storage transfer and recovery (ASTR) and infiltration basins
- Soil and aquifer clogging processes and strategies for management of clogging
- Water quality impacts on receiving groundwater associated with use of recycled water in MAR
- Economic feasibility of MAR for water recycling
- Lessons from practical experience

Dr Joanne Vanderzalm, Team Leader, Land & Water, CSIRO

Case Study | GOOGONG WATER RECYCLING TREATMENT PLANT

11:30 MWH - GOOGONG WATER RECYCLING TREATMENT PLANT

- Water Recycling scheme background
- Developer lead projects and associated stakeholder management
- Efficient use of space using latest treatment technologies
- Membrane Plant validation process
- 3D modelling and its benefits during the design process

Ran Virdi, Chief Mechanical Engineer, MWH

VALIDATION OF UF MEMBRANE PLANTS FOR WATER RECYCLING

12:00 VALIDATION OF UF MEMBRANE PLANTS FOR WATER RECYCLING IN VICTORIA, AUSTRALIA

- Background on South East Water’s Recycled Water Scheme
- Explanation of the Ultrafiltration [UF] pathogen removal targets by the health regulator.
- The requirement to develop a relationship between damaged UF fibres and pathogen log removal value.
- Explanation of the cut fibre testing method on UF modules and cut fibre test plant in Sydney, Australia.
- Discussion of cut fibre testing results.
- Summary of relationship between damaged UF fibres and pathogen log removal Value

Yunal Kumar, Process Engineer, South East Water

12:30 Lunch

01:30 FULL-SCALE UF VALIDATION: COMPARISON OF NEW VS AGED MEMBRANES

- An overview of the Glenelg Water Recycling Scheme (GWRS)
- LVV virus validation of a new UF membrane system
- Implications of a hazardous event
- Revalidation of an aged UF membrane system
- Full-scale LVV comparison of a new and aged membrane

Dr Petra Reeve, Wastewater Research Scientist, SA Water Corporation
RecycleWater 2015
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CERAMIC MEMBRANES FOR WATER RECYCLING APPLICATIONS

2:00 PERFORMANCE AND COST OF DURABLE CERAMIC MEMBRANES FOR WATER RECYCLING

- Dot points: 1. Membranes are widely used in water recycling schemes
  2. Polymeric membranes are most commonly used,
  3. Ceramic membranes show high performance, durability and reliability but are regarded as more expensive than polymeric membranes,
  4. The higher performance and long life of ceramic membranes makes them lower cost over the life of the plant
  5. Other benefits such as integrity reliability and physical durability benefit water recycling schemes

Prof. Mikel Duke, Victoria University, VIC, Australia

Case Study WATER RECYCLING: ENERGY – HEALTH OPTIMISATION APPROACH

2:30 “ENERGY–HEALTH BENCHMARKING: A NEW TOOL IN THE PURSUIT OF FIT-FOR-PURPOSE WATER RECYCLING”

- An introduction to water recycling in Australia, its technologies and energy use
- An overview of energy benchmarking approaches and Australian applications
- An introduction to the Australian Guidelines for Water Recycling and the opportunities it presents to achieve fit-for-purpose recycling
- Information from recent research into the development of a new energy-health benchmarking approach
- Case study reports on how the energy-health benchmarking was applied to South Australian recycling operations and the energy savings identified
- Insights into new research currently underway to further the development of the energy-health optimisation approach

Michael Short, Centre Fellow – Australian Water Recycling Centre of Excellence, Research Fellow – Centre for Water Management and Reuse, School of Natural and Built Environments | Division of ITEE, University of South Australia

INDIRECT POTABLE REUSE USING REVERSE OSMOSIS

3:00 INDIRECT POTABLE REUSE USING REVERSE OSMOSIS: RESULTS FROM WA RESEARCH

Perth’s Groundwater Replenishment Scheme is underpinned by 10 years of collaborative research into the health and environmental risks associated with wastewater recycling. The Curtin Water Quality Research Centre, along with research partners, has played a key role in investigating:

- Chemical removal by reverse osmosis treatment and assessing recycled water quality.
- Locally relevant information on chemicals in wastewater and recycled water.
- Characterising residual organic carbon in the reverse osmosis treated wastewater.
- Appropriate monitoring strategies

Kathryn Linge, Senior Research Fellow | Curtin Water Quality Research Centre, Senior Teaching Fellow | Department of Chemistry, Curtin University

3:30 Afternoon Tea

GUIDELINES FOR MEMBRANE BIOREACTORS (MBR)

4:00 DEVELOPING VALIDATION GUIDELINES FOR MEMBRANE BIOREACTORS (MBR)

- MBR are not appropriately credited for their pathogen removal efficiencies.
- A large survey of Australian MBR plants (180 site sampling) has been conducted to create the data set necessary to assess impact of operating conditions on LRV.
- The impact of membrane cleaning and replacement on LRV has been statistically demonstrated.
- The impact of other hazardous events (shock loads, physical damages...) has also been studies.
- A method to correlate online turbidity with LRV has been proposed.
- A draft for the validation guidelines is under review for future implementation in Australia.

Pierre Le-Clech, Associate Professor, UNESCO Centre for Membrane Science and Technology, UNSW AUSTRALIA

SUSTAINABLE WATER RECYCLING FOR AUSTRALIA

5:00 SUSTAINABLE WATER RECYCLING FOR AUSTRALIA

- A dot point: Sustainable water recycling for Australia
- Water recycling for Australia
- Water recycling future in Australia
- Current state of water recycling in Australia
- Water recycling in Australia
- Technology developments
- Public acceptance

Moderator: Dr John C Radcliffe, AM, FTSE, Honorary Research Fellow, CSIRO

5.15 Closing remarks from the chair

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