

OPERATOR

February 2018 Edition



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Newsletter of the WATER INDUSTRY OPERATORS ASSOCIATION OF AUSTRALIA

FROM THE MD'S DESK

Welcome to 2018 and we hope all our members had a relaxing and safe Christmas break.

Our staff have been busy producing the 2017 Annual Review which was recently distributed to Members. The Review provides an excellent snapshot of our organisation and the ever expanding suite of activities that WIOA and our members are engaged in. It also provides the opportunity to celebrate the achievements of many of our members. We hope you will enjoy reading it.

As we did in 2017, and in the interests of controlling our environmental footprint, we have not mailed a hard copy to every member. For those who received the email version of the Review, printed copies are available if you would like one. Just contact the office and we'll mail one out to you.

After undertaking a number of workshops throughout 2017, the Committee and Board signed off on an updated Strategic Plan for the 2018-2022 period in late November 2017. It includes many new and exciting initiatives and opportunities to benefit our members.

In December 2017, we staged our first ever online webcast to provide an update on the recertification scheme to certified operators and other interested parties. The webinar received over 60 registrations and enabled us to communicate with individuals from Far North Queensland, South Australia and the Eastern states of Australia.

We plan to utilise the webinar facility extensively in 2018 and beyond, with a series of technical and more general information webinars currently under development. The webcasts will allow us to link with and provide more services to our members, without the need for travel. We hope that our members will access the webinars when offered and we look forward to receiving input about potential future topics of interest as well. There is a report and some details on the next webinar later in this edition.

The Stage 2 Report from the Government Inquiry on the water quality incident in Havelock North in New Zealand was released in December 2017. The rather lengthy Inquiry Report contains 51 recommendations for changes to the management and regulation of drinking water supplies to reduce the likelihood of such outbreaks recurring in the future. The key recommendations include setting up a dedicated drinking water regulator, the treatment of all water supplies, and establishing a mandatory Licensing and Qualifications systems for Drinking Water Suppliers and Operators, including a requirement for ongoing professional development. As the certifying body for operators in Australia, for a number of years WIOA has been actively promoting the implementation of certification in Australia as a tool to assist in risk reduction, with relatively low uptake to date. Perhaps the New Zealand outcome will be a driver for the implementation of stronger risk management systems and potentially the adoption of certification here.

Another water issue with global significance is currently playing out in Cape Town, South Africa. Without rain, the city

of some 4 million people is on the countdown to "day zero" in mid April 2018 where the water supply could be turned off to around 75% of the city. In place of piped water, it is proposed to establish water collection points, scattered around the city to ensure the supply of the legally guaranteed minimum of 25 litres per person per day. The social and economic consequences of taking this action should it be required, are enormous and increases the risk of water shortages, sanitation failures, disease outbreaks and anarchy due to competition for remaining water. The impact of climate change has hit sooner than anticipated with plans to diversify the water supply with boreholes and desalination plants not due to kick in until after 2020. Although there were some strong criticisms of the governments of the day for constructing desalination plants in some Australian cities, we have avoided reaching the Cape Town situation. This case highlights the need for appropriate water supply regulation, planning, security and management. WIOA joins with a number of other Australian water bodies calling for a recommitment to, and renewal of, the National Water Initiative.

Planning for all the 2018 WIOA conferences is proceeding full steam ahead. The technical program for the NSW conference in Tamworth in April is full of interesting platform and poster presentations from experienced operations staff and there is a wide range of Councils represented in the program. Delegate and visitor registrations are currently being accepted, with the program and registration forms available from the website.

The Call for Papers for the Queensland conference in Logan in June closes on 21 February and we are still seeking more abstracts from operators in both the platform and poster categories. The first staging of the Mains Tapping competition in NSW will also be held at the Tamworth conference and we would like to encourage as many organisations as possible to enter a team.

Finally, those members yet to pay their 2018 fees would have received a reminder in the mail recently. Anyone not paid by the end of February will be removed from the member database, so please make sure you pay promptly.

Until next time,
George Wall – WIOA Managing Director

THE LIGHTER SIDE



PROFILE OF A MEMBER



Name: George Bellizia

Position: Operations Supervisor

Employer & Location: Veolia, Gold Coast Desalination Plant.

How long have you worked in the water industry and what attracted you to it?

39 Years. Started as an apprentice electrical Fitter/Mechanic at Sydney Water in 1978. I was attracted by the outdoors, variety of work and the characters I've met along the way.

What do you enjoy most about your job?

The variety of work from managing operation issues, High Voltage work, SCADA, Management Safety Rep and Electrical Mechanical work.

What are the major challenges in your current role?

Time, there never seems to be enough time in the day.

How long have you been a WIOA member?

9-10 years I think and maybe 5 years as a Queensland volunteer at the WIOA conferences.

How do you relax?

Converting oxygen to carbon dioxide, generally with my family and 3 granddaughters or following the mighty Cronulla Sharks.

Where do you live and what's the best thing about it?

Live at Elanora on the Gold Coast moved here in 2008 from the Sutherland Shire.

Quick questions

Age: 56

Nickname: Don't really have one that I know of.

Family Status: Married with 3 grown up kids and 3 grand daughters.

Pets: Cat and fish (always had dogs till the last one passed a few years ago)

Favourite food: Thai - Lemongrass Chicken

Least favourite food: Kale

Favourite TV show: Big Bang Theory, The Professor's Second Year Syndrome (Rugby League show on Fox)

Least Favourite TV show: Yasmin's Getting Married & Here Come the Habib's

Favourite Movie: The Hunger Games film series and any Marvel Movies (Captain America, Thor etc)

Favourite Musical artist/s: Queen, Pink, Lady Gaga, AC/DC, David Bowie, Fleetwood Mac

Favourite Book: Stuff You May Have Missed by Andrew Voss (rugby league commentator)

Favourite Team: Cronulla Sharks

Ambition in life: To become a millionaire so I can retire

Hobbies: Building things around the house & gardening

Best Trait: Never take life seriously

Worst Trait: Impatient

Four people to invite to dinner: Scarlett Johansson, Chris Angel, Donald Trump and Kim Jong-un.

VICE PRESIDENTIAL WEDDING

WIOA Vice President Heidi Josipovic and her beau Jamie Rossato tied the knot recently in Myrtleford. The lovely couple had a relaxing honeymoon in Las Vegas and Hawaii before returning to reality..... work. Congratulations from everyone at WIOA.



Heidi and Jamie wedding day.

TASMANIAN OPERATOR OF THE YEAR 2017

Congratulations to David Stacey from TasWater who was recognised for his significant contribution to the industry winning the WIOA 2017 Tasmanian Operator of the Year Award.

David was commended for not only his invaluable optimisation achievements but his instrumental contribution to training the next generation of water services operators.

David is an important member of the North West Services, Burnie Service Delivery team and is responsible for looking after the water, sewerage and pumping systems in the Burnie region. He has worked for TasWater for 6 years.

His constant focus on the optimisation of plant processes through research, cost savings, knowledge, improved processes, training others and sound observation practices has been invaluable to TasWater.

David is also the Operational Health and Safety Representative for the region and at every meeting brings good and achievable ideas to the table; he is always on the lookout for issues and is very active in ensuring TasWater's high standard of Zero Harm is maintained.

David has an in-depth knowledge base with water industry operations and is consistently seeking to improve on that knowledge. He tackles challenges with the same enthusiasm and is not intent unless striving to improve.

He is always on hand to assist or resolve any issues and is very much a cornerstone of the Burnie team.



David Stacey (L) and Robert MacDonald (R) receive their awards from Benny Smith from TasWater.

TASMANIAN YOUNG OPERATOR OF THE YEAR 2017

The hard work and dedication of Robert MacDonald from TasWater was recognised when he was announced as the winner of the WIOA 2017 Tasmanian Young Operator of the Year Award.

Robert was commended for his outstanding contribution to the industry and for consistently demonstrating TasWater's values and behaviours in his daily work.

Robert started work with TasWater as a member of the water metering team then he transferred into the urban treatment and pumps team to broaden his knowledge and experience.

He quickly demonstrated his ability to adapt to new systems and showed a willingness to learn, approaching his work with enthusiasm.

Robert is an integral team member that oversees the operation and maintenance of the Hobart sewage pumping network, using his skills and abilities to operate highly sensitive sites.

His dedication to working safely is outstanding, even at a young age Robert has made numerous suggestions in the workplace to make the site safer.

Robert always accepts any task or challenge in front of him and will work in any role or with anyone without fuss. He always demonstrates an eagerness to be involved in new treatment initiatives and is always keenly available to start early or stay back late to ensure the work is completed.

He was commended for consistently showing initiative and his innovative contributions to improve his workplace.



Robert operating a switchboard.

Both Robert and David now have a fantastic professional development opportunity (sponsored by TasWater) to participate in the annual WIOA hosted study tour of water and sewerage facilities in New Zealand, together with attendance at the WIOG New Zealand operators' conference in May 2018.

SOUTH AUSTRALIAN OPERATOR OF THE YEAR



The WIOA 2017 South Australian Operator of the Year is Brendan Roesler from Trility. Sponsored by TAFE SA, the award is designed to recognise and reward excellent performance, initiative and all round attention to detail by an operator.

Following the sudden departure of the previous Team Leader, Brendan acted in the role with the Lower Team for a decent portion of the most recent blackwater event in Trility's Riverland Region.

Brendan applied himself to the team, providing support for existing staff that were under additional stress and pressure, whilst also



Brendan Roesler (R) receiving the award from Lena Marcheson for TAFE SA.

ensuring that routine duties were being properly addressed. Since taking the acting role, there was just one minor notifiable event at one of the Lower Riverland sites. In the two months leading up to his appointment there were six minor and 1 major notifiable event recorded.

Brendan is a detail-oriented person and is recognised within Trility as someone who routinely understands and adheres to appropriate procedures, most of

which are based around our legislative and/or safety requirements. He has also been heavily involved as an operational representative through the implementation of Trility's new contractor and visitor induction system, as well as the development of the upcoming operational data management program.

Brendan has achieved his Certificate III in Water Treatment and



Brendan (L) undertaking fire training.

Certificate in Frontline Management. Brendan constantly strives for further self-improvement. He completed a Graduate Certificate in Business whilst still working full time in his role as Process Controller.

Team morale has been much higher since Brendan has taken over the Team Leader role. He has been continually praised for his professionalism, dedicated approach to work, experience, and calm demeanour from both within and outside of his team. For being named the South Australian Operator of the Year, Brendan also receives a fantastic professional development opportunity (sponsored by TAFE SA) to participate in the annual WIOA hosted study tour of water and sewerage facilities in New Zealand, together with attendance at the WIOG New Zealand operators' conference in May 2018.

CERTIFICATION WEBINAR

WIOA held its first ever webcast on 12 December 2017. The Certification update webinar attracted over 60 registrations from across Queensland, Victoria, New South Wales and South Australia. This demonstrated not only the level of interest in certification, but also the benefits of having a forum that allows members from all over the country to get together to hear the latest updates and share knowledge and experiences, all from the comfort of their own desk!

The aim of this first webinar was to; provide an update on WIOA's certification scheme; provide certified operators and their businesses an opportunity to see some of the creative ways other certified operators are maintaining their certified status; and how to meet the requirements of the Continuing Professional Development (CPD) component of the scheme.

Using the Adobe Connect platform, the webinar was aimed at certified Operators, HR professionals who support Certified Operators, and individuals with an interest in certification.

Craig opened the webinar with a welcome to all attendees and provided a run-down of how to use the Adobe Connect technology, including features such as the chat function and, my personal favourite, the emoticons! These can be used to express laughter or applause, ask the host to speak louder or slow down, or show raised hands. They're a great way for presenters to engage an audience during a live meeting.

George followed up with a presentation on the history and background to certification, and the latest information on certification and recertification for water, wastewater and recycled water operators. George also gave real examples of the type of activities and evidence that can be used by certified operators to maintain their ongoing certification.



Kathy, George and Craig in the first webinar.

Kathy gave the last presentation, comprising two case studies from Wannon Water and Veolia. The Wannon Water case study demonstrated how they have partnered with a Registered Training Organisation (RTO), to provide high quality refresher training to certified operators that is closely aligned with the ADWG. The Veolia case study presented examples of different professional development activities that provide alternatives to traditional training delivery. These included secondments, site tours, special projects and webinar-based activities, to name a few.

For anyone who missed out on this first webinar, George and Kathy's presentations are available for viewing on the WIOA website certification page at <http://wioa.org.au/certification/>

JAR TESTING WORKSHOP IN FNQ

The Cairns Regional Council played host to a Coagulation/Flocculation Jar Testing Workshop in January 2018, at their Tunnel Hill Water Treatment Plant. The training program, presentation and resources were prepared by Craig Jakubowski and Evan Jack from Hunter H2O, with WIOA's Kathy Northcott delivering the theory and practical jar testing training on the day.

Jar testing is a technique allowing some or all components of a water treatment process to be simulated at the bench scale in a "jar" (beaker). The aim is to trial different process conditions and chemicals to mimic how the water treatment plant will perform for a particular raw water quality. Treatment conditions that can be tested include; different coagulation/flocculation chemicals and dose rates, combinations of chemicals dosed at different times, increasing or decreasing mixing speed, and changing the times for mixing, flocculation and settling.

Jar testing allows water treatment operators to optimise their treatment processes and prevent potential water quality incidents, particularly when faced with changing raw water quality due to weather events. However, jar testing requires a solid knowledge of the chemistry of coagulation and flocculation. To become a proficient jar tester, an operator needs to gain knowledge in chemistry and maths, as well as water quality testing and process operations!!

A total of 12 water treatment operators attended the workshop from Cairns, Cassowary Coast, Cook, Croydon, Etheridge, Tablelands and Mareeba Councils. The attendees participated in a theory session in the morning, including a highly robust and enjoyable discussion about the various water quality challenges each operator had at their respective plants along with what measures they were taking to address water quality problems.



Part of the in-depth Q&A about the challenges of treating the raw water at each of their plants.

This was followed by an afternoon practical jar testing session, where the attendees were split into three groups and each tested a different raw water sample brought along on the day. The training concluded with the whole group coming together for a debrief of the results of the jar testing activity. This involved comparing and contrasting the different characteristics of each of raw water sample and how they responded to chemical dosing and coagulation/flocculation.



Kathy discussing and debriefing on the results of the jar testing.

WIOA extends a big thank you to Cairns Regional Council (particularly the water operators, Mark Gwynne and Joe Robinson) for hosting the event and getting everything set up for the day. Thank you to the Hunter H2O team for getting the training program

and materials together, conducting some of the training and for supply of jar testing equipment.

Quote from Mark Gwynne (Treatment Coordinator, Water & Waste, Cairns Regional Council):

"A huge thanks to Kathy Northcott who undertook the training on the day in a solo effort after Evan fell quite ill that morning. They say timing is everything!"

PROFILE OF A COMMITTEE MEMBER



Name – Simon Page

Position – Manager Operations

Employer – Cairns Regional Council

Nickname – Pagey (been that way since school)

Favourite food – Any, but if I had to choose one it would be Indian.

Favourite team – Cowboys followed closely by Brisbane Broncos.

Who do you admire – My Dad, he has been retired for many years and knows how to enjoy life to the full.

Three people you would invite to dinner – On a personal note, I would invite my late Mother. The other two people would have to be Wally Lewis (go Queensland) and Jonathan Thurston. I would think they would have some very interesting stories to tell.

Thoughts on the water industry at the moment

I think it is moving in a positive direction. The works that many organisations are undertaking I feel is improving the capability of the industry and consequently should result in a more robust industry. The biggest concern I have with my immediate area is ensuring we have a comprehensive succession plan in place for our aging workforce.

Your involvement with WIOA, and as a newer member on the WIOA committee, what contributions are you hoping to be able to make?

I am hoping that with my experience within the Water and Wastewater areas I should be able to add value to WIOA and to the industry as a whole.

JUGIONG WATER INTEREST DAY

More than 20 members attended the WIOA NSW Jugiong Water Interest Day held at Goldenfields Water County Council's (GWCC) Jugiong Water Treatment Plant in November. This included a number from nearby Riverina and Hilltops Councils. The morning started with some mingling over tea, coffee and biscuits in GWCC's newly upgraded conference room.



Tabitha Halliday (NSW Health) talks about the Water Quality Online Monitoring Database.

We were greeted by Geoffrey Veneris, GWCC's Production and Services Manager, as well as General Manager Phillip Rudd. Geoff gave the first presentation on GWCC's water treatment and supply scheme. Phil Rudd spoke about some of the recent big projects that GWCC have been involved in, such as the automatic metering project and pipeline replacements and renewals.

Tabitha Holliday from NSW Health, gave a presentation on the Online Water Quality Monitoring Database. The database is intended to allow NSW water businesses make their water quality data collection and reporting streamlined and more consistent.

Jill Busch from Aqualift, and also a WIOA board member, gave a presentation on the use of drones for asset inspections. Jill explained the rules and safety requirements around the use of drones for surveillance monitoring, as well as how to get the most effective use out of the technology.

Mark Halliwell, representing Taggle, the Interest Day sponsor, then talked on "the internet of things" and how new, innovative and cost effective sensors, meters and monitors are changing the face of the water industry through better data acquisition and real time monitoring and reporting. He gave some practical examples and case studies of how these systems and products are being used by water businesses, particularly in NSW.



Tony Corby (GWCC) giving a tour of the Jugiong WTP.

After an excellent lunch and salads, the attendees were given a tour of the Jugiong WTP by the site operator, Tony Corby. Tony has worked at the Jugiong site for the entire working life of the current treatment plant, and had a wealth of knowledge about the operations and the facility. He gave a fantastic and interesting site tour that was enjoyed by everyone in attendance.

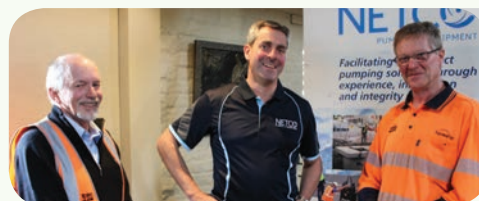
We look forward to next year's event to continue the information sharing in our region.

Contributed by Sally Taylor, Amiad Area Sales Manager

TASMANIAN WASTEWATER INTEREST DAY

Another valuable Interest day was held at JJ's Bakery & Café in Longford followed by a tour of the Longford wastewater treatment plant.

Nathan Cruickshank from Netco Pumps & Equipment commenced the day talking about using magnesium hydroxide (MgOH) to reduce odours in the sewer systems. The magnesium neutralizes acidic wastewater and raises the pH above 8.0 which reduces the reproduction of sulphides in the sewer, along with reduction of odour. Magnesium hydroxide is also very safe to use.



Lester Little (L) and Gary Lanham (R) with Nathan Cruickshank from Netco.

Anthony Allen, TasWater Process Engineer discussed the challenges faced with aging infrastructure and also trade waste that enters the sewer systems. Anthony identified where improvements could be made on some of the larger plants and also there was a need to fine tune the smaller plants. Anthony's team along with members from the Operation & Maintenance group are working together to resolve the issues that TasWater face.

TasWater's General Manager of Service Delivery, Bennie Smith had the pleasure of announcing winners of the 2017 Tasmanian Operator of the Year along with the Young Operator of the year awards. Congratulations to David Stacey and Robert MacDonald for their efforts.

Kathy Northcott, WIOA's new Technical Operations Officer discussed the use of activated carbon in wastewater treatment applications. Kathy spoke about the life of the carbon, and the use of biological activated carbon to remove algae toxins and biodegradable organics.

Catherine Thomas, TasWater's Senior Engineer Major Projects spoke about the challenges that faced at the Longford lagoons. The Longford abattoirs (JBS) contributes 70% of the organic load coming into the plant which makes it difficult to operate and maintain, not to mention meeting the EPA discharge requirements. They also face challenges with containing odour within the boundary of the plant. The plant is high on TasWater's agenda for an upgrade.



The Longford wastewater treatment plant.

Catherine and Butch Towns took the group for a tour of the Longford plant to finish up what was a great day. Thanks to everyone involved.

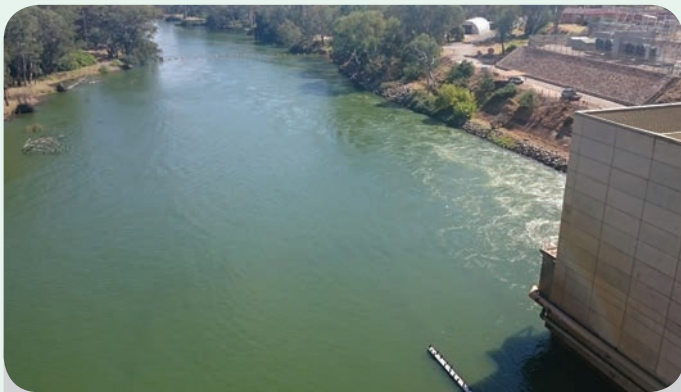
Contributed by Lester Little, TasWater

HARMFUL ALGAL BLOOMS - THE NEW NORMAL FOR AUSTRALIA?

Darren Baldwin (Latrobe University) posed the question “*Are toxic algal blooms the new normal for Australia’s major rivers?*”. His article posted on The Conversation in May 2016 was written in response to a serious outbreak of blue-green algae in the first half of 2016. The bloom affected over 1700 km of the Murray river, flourishing in the hotter-than-average conditions during that summer.

Australian waterways are commonly affected by cyanobacterial (blue-green algal) blooms. The first known reports were made by settlers as early as the 1800s. However, blooms of the size and impact of that which occurred on the Murray in 2016 are a relatively recent phenomenon. In 1991 an algal bloom affected more than 1,000 kms of the Darling River. This was the first time such a bloom had been classified as an environmental disaster for an Australian river, and one of the few times such a significant event has occurred internationally.

Since the algal bloom event on the Darling in 1991, there have been a growing number of similar blooms occur on the Murray river. These occurred in 2007, 2009, 2010 and 2016. The 2007, 2009 and 2010 algal blooms all happened during a severe and extended period of drought, and general opinion chalked the occurrence up to extreme weather impacting water supplies.



Blue green algae in the Murray river, below the Hume Dam in 2016. Photo by Peta Thiel (Research Laboratory Services).

The 2016 bloom was different, in the sense that low water levels did not play a significant factor. Additionally, the main blue-green algae type, *Chrysosporium ovalisporum*, had previously only been reported in very low numbers in the Murray. Since monitoring began in 1978, the algae had never-before been determined as causing a bloom in the Murray River. The algae is known to prefer warm temperatures, with overseas blooms recorded when water temperatures reach 26°C.



Blue green algae in the Murray river at Barmah in 2016. Photo by Peta Thiel (Research Laboratory Services).

It’s clear that algal blooms pose a serious risk to health, the environment and the Australian economy. What is also becoming apparent is that the prevalence and magnitude of algal blooms in Australia is on the increase. There is an understanding that the causal factors are more complex than simply low water levels or drought conditions. There are a wider range of harmful algae species being detected and in growing numbers. Hence algal blooms pose a major risk to the Australian water industry both now and into the future.

What are the Impacts of Harmful Algal Blooms?

Algal blooms are a major water-quality issue affecting management of surface waters globally. In addition to causing taste and odour issues, these blooms have the potential to produce a variety of hepato- and/or neurotoxic compounds (cyanotoxins). These toxins can damage the liver and neurological system of both humans and animals and in severe cases can cause death. The cell walls of all blue-green algae contain irritants which can cause gastrointestinal, skin, eye and respiratory irritations to humans and animals.

In drinking water supplies, the presence of large amounts of blue-green algae may cause taste and odour problems. When the algae die and enter the feedwater to a treatment plant, they can cause filter blockages and can impact the effectiveness of coagulation/flocculation and clarification processes. Blue-green algae toxins pose serious challenges from a water treatment perspective. Once released from algal cells the toxic compounds can readily pass through filters, and some toxins are highly resistant to oxidation processes such as chlorine, ozone.

Excess growth of blue-green algae in reservoirs reduces the sunlight available to aquatic plants and may lead to their death. When aquatic plants and algae die and decompose, the dissolved oxygen in the water is consumed. This decrease in available oxygen can lead to the death of aquatic animals such as fish and can increase the release of nutrients and toxic chemicals from the sediments.

What are the Challenges for the Water Industry in Addressing Algal Blooms?

Understanding, predicting and managing harmful algal blooms in Australia’s waterways are a challenge to the water industry, due to our limited capacity to bring together different scientific disciplines, water operators and managers.

At the management level in the water industry there are well developed protocols and guidelines to mitigate risks to human health from algal blooms. However, barriers to communication and collaboration between regulators, managers and scientists can lead to a disconnect between the theory and practice of algal bloom management.

The breakthrough in improving predictions of when and where harmful cyanobacterial blooms will occur – ultimately what is of most interest and value to water managers – is most likely to come through improving the collaboration between the various disciplines and practitioners, and being able to successfully harness the multiple emerging technologies that are increasingly becoming available.

How is the Industry Responding to the Challenge?

The Global Harmful Algal Blooms (GlobalHAB) Programme is the successor to the UNESCO GEOHAB project. GlobalHAB is aimed at fostering and promoting co-operative research directed toward improving the prediction of harmful algal bloom (HAB) events, and providing scientific knowledge to manage and mitigate their impacts. GlobalHAB will address the scientific and community challenges of HABs through application of advanced technologies, training and capacity building. It also aims to build linkages between different science streams, medicine, public health, emphasize social science communications and address management priorities.

Here in Australia, the Nuisance and Harmful Algae Science-Practice Partnership (NHASP) is a multi-party initiative between the UNSW Global Water Institute, the University of Newcastle, the Walter and Eliza Hall Institute of Medical Research, Polytechnique Montréal and Melbourne Water. NHASP is seeking to more effectively manage blooms by researching smart surveillance technologies, cost effective policy development and better asset design for the benefit of the Melbourne region. Whilst the major industry partner for this project is Melbourne Water, other utilities and agencies across Australia stand to benefit in the research outcomes.

WaterRA has a strong history of targeted blue-green algae research and communications. Through the WaterRA website there is access to fact sheets, research projects and initiatives that focus on addressing the risks and challenges of algal blooms to the water industry. The following table provides some of the projects, either completed or in progress, that may be of interest to water businesses. Information and updates on the National Cyanobacterial Workshops is also available via the WaterRA website.

For More Information:

The Conversation:

<https://theconversation.com/are-toxic-algal-blooms-the-new-normal-for-australias-major-rivers-59526>

WaterRA:

<http://www.waterra.com.au/events/cyanobacteria-workshops/>

GlobalHAB:

<http://unesdoc.unesco.org/images/0023/002334/233419e.pdf>

NHSAP:

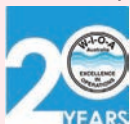
<http://www.algae.unsw.edu.au/>

20 YEAR MEMBERS

WIOA recognises any individual or corporate members who have maintained their membership for 20 or more consecutive years, presenting them with a special Membership lapel pin.

This year there are another 10 Individual and 7 Corporate Members who have qualified for the 20 year recognition pin. The Individual recipients of the pin in 2018 are: Paul Brown, Dean Chambers, Pat Davis, Gerard Dooley, Peter Dwyer, Greg Plier, Jeff Roscoe, Brian Scobie, Ken Turner and Mark Welsh. The Corporate recipients are Gippsland Water, North East Water, Complete Tapping Service, EDAC Electronics, Grundfos Pumps, KSB Australia and Metaval.

Congratulations to you all.



In 2018 WIOA will provide a series of webinars for members. These will include a technical webinar series featuring key industry issues and the latest trends and technologies, as well as general interest webinars on topics and issues that impact people and culture within water businesses.

Aiming to conduct possibly one **WIOA Talks** webinar per month, a schedule of the topics will be published on the WIOA website and communicated to members through our monthly newsletter Words. The **WIOA Talks** will be scheduled to run for a maximum of 1 hour and will include presentations and an opportunity for a Q&A session for participants via an online chat function.

The topic for the first **WIOA Talk** is a technical session titled **“Operational risks, mitigation and management strategies during algal bloom events”**

To be held on Tuesday 6 March 2018 at 11.30am to 12.30pm AEDT, registration is limited to the first 100 members to register, and attendees will be contacted with the login instructions, closer to the event.

We have put together a line-up of speakers with extensive practical operational knowledge and experience in addressing the challenges of algal bloom events, including the impacts to drinking water sources, treated water quality and process operations.

WIOA Talks – Algal Bloom Program

- Murray River Grand Tour – learnings from the 2016 Algal Bloom (Peta Thiel, Research Laboratory Services)
- Managing raw water storages during algal blooms (Greg Smith, Goulburn Murray Water)
- Operational management to address algal risks for WTPs (Steven Newham, Goulburn Valley Water)

The **WIOA Talks** will allow members from all over the country to hear the latest updates and share knowledge and experiences – and all from the comfort of their own desk! Using the Adobe Connect web conferencing software, **WIOA Talks** aim to provide members another way to access information and increased opportunities for collaboration.

Other potential technical topics for 2018 include; remote operations, data acquisition and management, and the latest R&D projects across the industry. For those interested in the people and culture area, some planned talks include topics such as women in water and mentoring.

For queries, feedback, suggestions for **WIOA Talks** topics and presentations, or to volunteer to give a presentation at an upcoming webinar, please contact George, Craig or Kathy at WIOA.

BIRDS EYE VIEW

Facilities Members Operate

Mount Kynoch

Water Treatment Plant, Toowoomba



The Mt Kynoch Water Treatment Plant supplies the water used by more than 122,000 residents and businesses in Toowoomba and surrounding areas. It can treat up to 63 million litres of water each day. This involves the removal of suspended particles, metal ions and micro-organisms from the water, and disinfection to make it safe for human consumption.

1 Pre-Treatment - Raw Water Inlet

Raw water for the plant is pumped from Cressbrook, Perseverance and Cooby dams, as well as Great Artesian Bores, which are then blended at the Mt Kynoch intake. During an organic contamination event, Powdered Activated Carbon (PAC) can be used to remove these contaminants. PAC is dosed into the raw water before entering the treatment process.

2 Coagulation – Inlet Tank

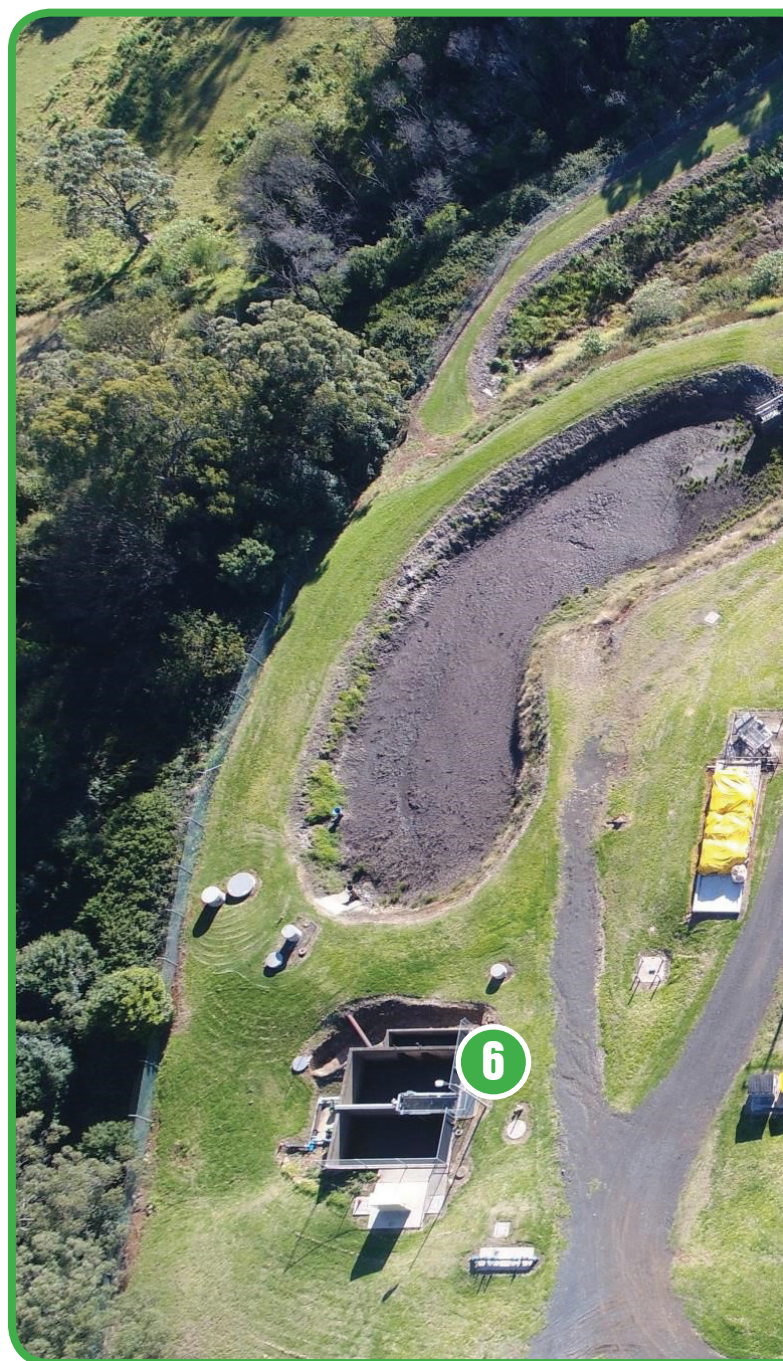
A coagulant agent is added to the raw water in the inlet tank. A flash mixer helps improve the mixing process. The main chemical used is the coagulant Polyaluminum Chloride (PACL). The PACL coagulant affects the charge on the surface of microscopic particles suspended in the water. This reduces the repulsion between the particles, allowing them to coagulate. This produces 'flocs' which become large enough to be easily removed in the later stages of the process.

3 Flocculation – Flocculator Tanks

After the addition of the primary coagulant, the suspended materials in the water form into clumps known as 'floc'. To facilitate this, the water is fed into five flocculator tanks where it is slowly mixed to ensure the floc is able to take up as much of the suspended material in the water as possible.

4 Sedimentation – Settling Tank

Once the floc has been formed in the flocculation tanks, the water is fed into the settling tank. The goal of the settling tank is to remove as much floc (dirt or organic matter) as possible before the water enters the filters. To aid this process the water is passed upwards through a latticework of sloped tubes. This gives the floc additional opportunity to settle from the water and stick onto the sides of the tubes that are on a 60 degree angle and collect at the bottom of the settling tank. The sludge created by the settled floc process is periodically flushed to the sludge lagoon. When operating in 'contact filtration' mode the sedimentation process is bypassed.



Contact Filtration

Flocculation and sedimentation are used when the incoming water quality is poor. In this case, the plant operates in the 'conventional' mode. However, when raw water quality improves (turbidity <5NTU), these processes are bypassed to operate the plant in 'contact filtration'. This occurs approximately 80% of the year, using less coagulant chemicals, reducing the overall cost and producing less sludge from the process.

5 Media Filtration – Filters

Chlorine is added to the water before filtration to oxidise any metals (iron and manganese) in the water, converting the metals into a solid form allowing removal in the filters. Before water arrives at the filters, a filter aid (Anionic Polymer) is added which gives the filter media a slippery coating, so the floc penetrates into the media and doesn't block the surface of the media. The polymer also acts as a glue to bind smaller groups of floc together. This means that less PACL is needed to get the same water treatment result.



The water is filtered through eight gravity multimedia filters, removing any particles that may have passed through the settling tanks. The eight filters are composed of a layer of coarse filter coal, placed on a layer of fine sand and then three layers of rocks - from small pebbles to larger rocks at the bottom. In contact filtration a finer floc is formed, reducing the volume of sludge produced during the treatment process.

The filters gradually reduce in efficiency as they 'block up' and must be backwashed regularly. This is usually every 24hrs to 32hrs depending on water quality and plant operation.

Disinfection – Clear Water Tanks

Once filtered, the water is disinfected with chlorine to kill any micro-organisms that may have passed through the earlier stages of the plant. Contact time for the chlorine disinfection process is provided in the clear water storage tank. There are three on-site reservoirs where the treated water is stored before it is fed to the reticulation system. If needed, the pH of the water can be increased by the addition of lime in the clear water tank. This correction also prevents pipeline corrosion.

After the votes from more than 150 members of the public were counted, the Toowoomba Regional Council's Mt Kynoch Water Treatment Plant took out the Ixom 2017 Best Tasting Tap Water in Australia competition in Launceston in October.

The sample will go on to represent Australia at the Berkeley Springs International Water Tasting Competition to be held in West Virginia, USA in February 2018.

6 Backwash Recovery System

A sludge thickener is used to separate the sludge from the backwash water. The sludge thickener discharges concentrated sludge into the sewer system, while the clear supernatant is returned to the inlet works.

WHAT'S ALL THE FUSS WITH PFAS?

What are PFAS?

Per- and poly-fluoroalkyl substances (PFAS), are a class of man-made chemicals that have been in use since the 1950s. PFAS are found in products that resist heat, stains, grease and water. Considered for many years to be extremely useful compounds, PFAS was widely used in furniture and carpets treated for stain resistance, foams used for firefighting, fast food and packaged food containers, personal care products and cleaning products. Historically, the PFAS with the highest production volumes were perfluorooctane sulfonate (PFOS), and perfluorooctanoic acid (PFOA).

PFAS chemicals were used so widely, due to their high level of chemical stability. PFAS are soluble in water and don't break down easily when exposed to other strong chemicals, sunlight, temperature etc. However, the same characteristics that make these chemicals so useful in a range of products, have recently resulted in growing concerns about their ongoing impacts to the environment and risks to public health.

In the early 2000's international studies showed widespread distribution of PFAS throughout the environment, with levels detected in blood samples taken from humans and animals from all over the world. It was found that PFAS chemicals were readily transported by rivers and ocean currents, groundwater, as well as in the atmosphere. They could persist in the environment for decades without breaking down, and they accumulated in the bloodstream and tissues of animals.

In June 2016, the Australian Commonwealth Department of Health tasked Food Standards Australia New Zealand (FSANZ) with the development of health-based guidance values for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS).

In April 2017, new tolerable daily intake levels (TDIs) of polyfluoroalkyl substances (PFAS) were announced, in line with US standards. These guideline values will be used consistently in undertaking human health risk assessments across Australia.

What is the Industry Doing in Response to PFAS?

Water Research Australia (WaterRA) has been leading the charge with regards to the water industry response to growing awareness and concern over the presence of PFAS in water supplies. A PFAS fact sheet was issued by WaterRA in May 2017 and in December 2017, WaterRA held a PFAS Community of Interest (CoI) workshop in Melbourne. The workshop was well attended by representatives from water utilities, regulators, research institutions and peak industry groups from all over Australia.



The WaterRA PFAS Workshop in Melbourne.

The aim of the workshop was to determine the implications for the water industry of more stringent guidelines relating to PFAS, and what measures the industry can take to minimise the risk to their customers, businesses and reputation. Outcomes of the workshop were the identification of priority areas for further knowledge, recognising knowledge gaps and knowledge transfer opportunities to address the priority areas.

Further information on PFAS issues, the PFAS Community of Interest and priority projects can be found via the WaterRA website, the WaterRA PFAS knowledge portal or by contacting WIOA's Technical Operations Officer, Kathy Northcott kathy@wioa.org.au.

WIOA'S NETWORK OPERATOR DEVELOPMENT PROGRAM

The second staging of WIOA's Network Operator Development Program (NODP) commenced in Melbourne on 8 February 2018 with a cohort of 14 participants from Victorian water corporations and service providers.

The purpose of the NODP is to identify, mentor and develop future leaders in the Network Operations field across the Victorian Water Industry. The Program aim is to expand the knowledge, skillset, network of colleagues and practical experience of Network Operators by exposing them to strategic thinking and best practice initiatives across the technology, business management and leadership fields.

Participants will be exposed to a range of training delivery techniques including structured workshops, field days, technical sessions, comparative analysis of practices within the industry, projects and conference attendance over the course of the eight month program period.

Session 1 was aimed at the high level end of the industry with presentations from the EPA, Department of Health and Human Services and two highly respected Water Corporation Managing Directors. The second part of Session 1 focussed on leadership, management styles, personality behavioural traits, and identifying and dealing with different personality types within work teams.

Future sessions will examine: Water Quality, Water Distribution Systems, Wastewater Collection Systems, Pumps and Pumping Systems, and Asset Management.



NODP 2018 Participants.

QUEENSLAND WATER SKILLS PARTNERSHIP SKILLS FORUM

A Skills Forum organised by the Queensland Water Skills Partnership is being held on Wednesday 28 February 2018 at the Crosby Park Events Centre, 103 Crosby Road, Albion, Brisbane.

This forum is the result of strong industry interest in sharing knowledge and experiences around meeting the challenges of recruiting, retaining and upskilling staff.

Both George and Kathy will be representing WIOA at the forum. George will facilitate a question and answer session in relation to operator certification. He will also be awarding certified operator credentials to any operators who have met the requirements to be certified under the National Certification Framework for Operators within Drinking Water Treatment Systems, and Wastewater and Recycled Water Treatment Systems. Kathy will be speaking about *“Engaging with contractors on workforce needs and industry standards”*, in the Contractors, **Industry Standards and Collaboration** session of the program.



Attendees at qldwater's annual forum in 2017.

For further information, or to register for the forum, visit the **qldwater** website http://www.qldwater.com.au/Events_2018



NSW Main Tapping Competition

Following the successful Queensland and Victorian Live Main Tapping competitions held at the WIOA conferences in 2017, we are thrilled to announce the first WIOA NSW Mains Tapping Competition will be held at this year's NSW conference in Tamworth.

The winning team will get their names on an impressive perpetual trophy and the opportunity to nominate a local charity to receive a \$1,000 donation.

Register your team by email before Thursday 5 April to: Craig Mathisen at WIOA craig@wioa.org.au

More information can be found at: wioaconferences.org.au/nsw/nsw-mains-tapping-competititon



WIN A TRIP TO NEW ZEALAND

PASS (Problem Accepted Solution Supplied) Award

The PASS Award provides an opportunity for operational staff to share their in the field innovations and fixes to problems so that others in the water industry can benefit. It is a fantastic opportunity for members of WIOA to receive recognition for their innovation and efforts and lets us share the good ideas and innovations with other Members.

Applications will be accepted until 1 March 2018 with the winner announced at the NSW Conference in Tamworth. The prize for the winner is an all-expenses paid opportunity to join the WIOA contingent on the tour of NZ and to attend the WIOG operations conference to be held in Palmerston North from 9 to 11 May 2018.

All the entries, including the winner of the award, will be published in the PASS Award booklet that provides our members with useful tips on improving day to day work practices.



A site visit on the WIOA tour of New Zealand 2017.

WIOA FOOTY TIPPING WILL BE BACK IN 2018



Both the AFL and NRL competitions will be created as soon as we are able to create leagues on

tipping.afl.com & tipping.nrl.com

Competition codes will be provided in a future edition of 'Words' and on the WIOA website.

WIOA VICTORIAN WATER INTEREST DAY VICTORIAN DESALINATION PROJECT

After arriving at the Desalination plant, I expected to see a massive concrete eye-sore, however, we were all quite surprised with how well the plant blended into its natural surroundings.

The day started off with a short introduction from Rosemary Stewart (Community Liaison Officer), followed by a presentation from Greg Mercer (Plant Director). He outlined the how this mammoth project was delivered from the beginning of the construction phase in 2009, to the everyday running requirements, including the 100mW power supply. Two seawater intake structures located on the sea bed consist of two vertical risers 20m below the sea surface, to slowly draw water into the desalination plant via a 1.2km tunnel. The two outlet structures that discharge saline concentrate back into the sea are connected to a 1.5km marine tunnel, and quickly diffuse the concentrate to not alter the natural environmental conditions.

Next up was Julien Tavvry (Plant Operations Manager), who spoke to us about plant operations and the challenges Watersure face during production. The desalination plant comprises three identical “streams”, each capable of producing 50GL/year (150GL combined), with the room to expand to 200GL/year, now that’s a lot of water! The plant has 3 modes Idle / Long Term Preservation / Production. Currently the plant is in long term preservation, and can take two weeks to get ready for production mode. During non-production periods, WaterSure is required to keep full staff on-hand to carry out preventive maintenance year-round. The Government orders water in March each year, with the minimum production of 15GL to start approximately in June, usually lasting for about four months.

Membrane integrity directly relates to the efficiency of producing high quality potable water, and Marlene Cran, from Victoria University, spoke to us about some of the analytics they use to determine the condition of the membranes. Membranes can be sent off for a “membrane autopsy” or fouling analysis, to determine shortened lifespan causes.

WIOAs own Kathy Northcott (Technical Operations Officer) gave a presentation on how to manage membrane issues, including maintenance, CIP backwashes and general troubleshooting.

One of the protocols in going from preservation to production is working with chemical suppliers to ensure all chemicals are delivered within the required timeframe. Mark Cummings from IXOM took the time to share with us some of the challenges involved and the risk management of chemical deliveries to the site. Lunch was also kindly provided by IXOM

After lunch, Rosemary Stewart took us on an extensive tour of the desalination plant, starting off with pre-treatment. Dual Media Pressure Filtration (DMPF) is used as a pre-treatment to remove fine particles from the seawater before it undergoes Reverse Osmosis (RO). RO is a treatment process that uses energy to push water across a semi-permeable membrane, leaving a high-salinity concentrate behind, hence the term “desalination”. Each stream has a total of 55,000 membranes, each with a surface area of 40.9m². When walking into the RO building, we were all surprised by the sheer size of the operating area, with stack of membranes 3 stories high everywhere we looked. Most of us took the opportunity to take some pictures at this point as it was absolutely jaw-dropping.



Wonthaggi Desal Plant.

After disinfection and mineralisation, the treated water is sent through an underground pipe around 84kms to Berwick, where it joins the rest of Melbourne’s retic system.

After the conclusion of the tour we were given the opportunity to talk to some of the operators’ onsite and have any questions answered before heading home.

On behalf of everyone who attended the WIOA Victoria Water Interest Day, we’d like to say a huge thankyou to everyone involved. It was a great insight into how potable water can be produced on such a large scale, and how the associated challenges are overcome.

Contributed by Stephanie Badger, Gippsland Water

HAPPY VALLEY INTEREST DAY

In November 2017, the SA Advisory Committee held a water interest day at the Happy Valley WTP. The support of team from Allwater (the Suez, Broadspectrum & SA Water alliance) who hosted us at their facility for the day and Hydramet who sponsored lunch was greatly appreciated.

The group of around 25 attendees heard from Sam Loveder from SA Water about the potential implications of releasing the carp herpes virus into the River Murray and what it might mean for our drinking water supplies. He detailed the research SA Water is undertaking where bulky bins are filled to different levels with rotting carp carcasses and the resulting water jar tested at different stages of the fermentation cycle. This testing for different organic loads will give water treatment plant operators along the Murray a good idea of what to expect once the virus is released.

Peter Hobson from SA Water also detailed how sodium percarbonate has been trialled in different section of the Happy Valley Reservoir to control cyanobacteria growth as an alternative to copper sulphate dosing. As many operators know, copper sulphate dosing is a task that at best is annoying and the percarbonate offers the potential for simpler dosing techniques and lower doses. The challenge of conduction research in a live reservoir was also highlighted with anecdotes from the researchers on the effectiveness of baffles shared.

Neil Crossing, the past WIOA SA Advisory Committee Chair, gave a great talk about the filter upgrades being carried out by Allwater at the Adelaide metropolitan plants and showed just how difficult it can be upgrading older plants to meet modern standards.

As sponsor of the day, we were fortunate to have Hydramet's General Manager Craig Dickson speak about the benefits of different types of chlorination, particularly how electrolytic techniques compare to traditional hypochlorite and gas system. Craig flew in from Perth for the day, so it was great he could participate.



Chris Dickson from Hydramet presenting.

Following lunch, Lena Marchesan, representing sponsor TAFE SA announced Brendan Roesler as the winner of the 2017 SA Operator of the Year Award. Brendan is the team leader based in TRILITY's lower Riverland team where he operates water treatment plants in Mannum, Tailem Bend, Balhannah and Murray Bridge as well as a wastewater treatment plant at Birdwood. Brendan has many years of experience in the water industry and was a very worthy winner of the trip to New Zealand.



Delegates about to depart on the Happy Valley plant tour.

The day concluded with a really interesting tour of the Happy Valley water treatment plant. Happy Valley is Adelaide's largest water treatment plant and through the north-south inter-connector can supply water to most parts of the metropolitan region. It was terrific to hear directly from the operators about some of the challenges that come with such large filters and the upgrades that are currently being carried out to make backwashing and performance better. It was terrific to see what Allwater and SA Water are doing to ensure the ongoing quality of Adelaide's drinking water.

Contributed by Robran Cock from Trility

LEARNING & ORGANISATIONAL DEVELOPMENT



VICTORIAN WATER
INDUSTRY ASSOCIATION INC.

The VicWater Learning and Organisational Development Network (L&OD Network), held their network meeting on the 7th December 2017 at Western Water's head office in Sunbury, Victoria.

The VicWater Learning and Development Network was established in August 2015 and is currently chaired by Courtney Smyth from South East Water, Deputy Chair is Zara Milenkovic from Goulburn Murray Water, and supported by VicWater Secretariat, Paul O'Brien. The primary purpose of this Network is to serve as a forum for L&D professionals within the Victorian Water industry to identify and plan for emerging L&D needs, and to share better practices including sharing resources.

Currently the Network meets three times each year, with a view to information-sharing and actively progressing priority projects, which are identified in the last meeting of each calendar year. In addition to the 3 meetings, the network members engage with each other through an on-line collaborative portal, to optimise the opportunities to share practices and resources.

In the December 2017 meeting, the network agreed on two main priority projects to progress in 2018:

1. Graduate Rotation program for Victorian water businesses

The aim of this project will be to pilot a program for providing graduates the opportunity to undertake fixed term secondments to other water businesses across Victoria, during their graduate program. Further details will be provided as the working group develops the project.

2. Technical Operational Competency Frameworks for the Water Industry

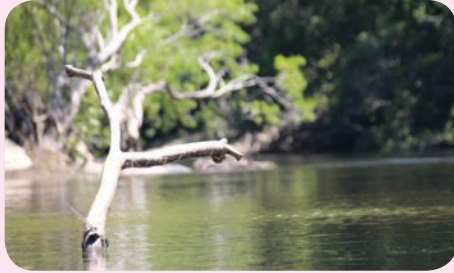
The aim of this project will be to develop guidance material on the development of technical competency frameworks for the Victorian water industry. This will communicate examples of good practice in developing technical competency in the water industry context. Approaches for planning and delivery of learning and development (L&D) programs to achieve technical competency will be communicated, through examples and case studies.

For anyone interested in participating in the above projects, or for further information on the Vicwater L&OD Network and activities, please contact VicWater (vicwater@vicwater.org.au)

MONITORING IN THE FAR NORTH

The Wujal Wujal Aboriginal Shire Council has taken an innovative step in environmental management, installing its own state-of-the-art weather station and water monitoring equipment.

The town is in a valley that has no government weather monitoring, with the nearest Bureau of Meteorology stations at Cooktown to the north, and Cairns to the south. The technology will allow the Council to continually monitor the quality of water in the Bloomfield River in real time, and help with preparations for severe weather events. It is believed to be the first time an Aboriginal Shire Council has installed the technology.



The Bloomfield River (photo courtesy ABC News: Casey Briggs).

The monitoring station is important from a local, state and federal compliance perspective, as well as being a cultural custodian requirement. Council staff can actually use traditional storylines and [marry that] with the datasets from a western framework ... anecdotally they know that there are changes in the weather patterns being experienced.

The council has also become the first Aboriginal Shire to join the Great Barrier Reef Marine Park Authority's 'Reef Guardian' program. The program is an attempt to unite local governments in the reef's catchment with conservation efforts, encouraging local communities to take up stewardship of the environment.

The runoff from the region goes straight into the Great Barrier Reef marine park area and due to the strong community connection to sea country, there is a strong desire to protect that sea country.

The Council's water and waste coordinator Peter Kirchmann advised that the information would be used to monitor changes over time. The data will indicate exactly when tidal influence is on the river, and also how flood and rain events are affecting the river. The council will start producing annual reports, and eventually the data would be made available to scientists. Having the equipment available means that the Council will be able to monitor and identify whether the environment changes at all, and whether farming upstream has an impact.



Ray Sycamore (photo courtesy ABC News: Casey Briggs).

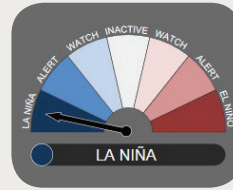
Ray Sycamore, who is the first Indigenous person in Australia to become a WIOA Certified Water Treatment Operator, believes it is important the river system is looked after for younger generations.

"Being a seaside people we also get our food from the sea, and we'd like [to continue] that part of our culture, and ensure that where we get our food from is a clean area. Water is everything ... not only in Indigenous culture but in all cultures, it keeps us alive."

Adapted from the ABC Far North Queensland article by Casey Briggs and Fiona Sewell, published on 12 Dec 2017.

The full version of the article is available at <https://tinyurl.com/yc2fhdvt>

LA NIÑA, BUT NOT AS WE KNOW IT



The Bureau of Meteorology recently shifted their ENSO Outlook to LA NIÑA.

This follows a steady cooling of the central to eastern tropical Pacific Ocean since late winter. Waters in this area have now reached La Niña thresholds (0.8°C below average), and atmospheric indicators, including the Southern Oscillation Index (SOI), trade winds and cloud patterns, are also at La Niña levels.

However, this La Niña is likely to be weaker than recent events, far shorter-lived, and not expected to continue far into autumn. So what does that mean for Australia's climate over the coming months, and what actually is La Niña?

La Niña is one of the three phases of the El Niño – Southern Oscillation (ENSO) – a climate pattern in the tropical Pacific that cycles every three to seven years, and influences climate right around the world. One area that experiences the biggest impacts of ENSO is Australia.

A La Niña typically brings above-average rainfall to eastern Australia during summer. But from history it is known that the strength of a La Niña event often corresponds to the strength of its impacts on the Australian climate.

This year, La Niña is weaker than many past events, so an equivalent increase in rainfall is not expected. Ocean temperatures around northern Australia and in the eastern Indian Ocean are another factor. Normally during La Niña these are a lot warmer than average, but this time they are closer to normal. As a result, this event is likely to have less influence on rainfall, cloudiness and tropical cyclones than the last La Niña summer we had – the near record strength La Niña in 2010-12.

La Niña isn't the only factor that drives Australia's climate. Patterns in the Indian and Southern oceans, and around the tropics also play a big role in determining how our climate will play out in the coming months.

Local factors can also play a significant role. Soil moisture, vegetation, and local sea temperatures can all contribute to our climate. And our slowly changing climate patterns also have a background effect. Our models take all of these into account.

The latest climate outlooks for likely rainfall and temperature conditions in the months ahead can be viewed at <http://www.bom.gov.au/climate/outlooks/#/overview/summary/>

NOVEL WATER MONITORING PROJECT

Singapore's national water agency PUB recently announced that five robotic swans will be used at various reservoirs in Singapore to monitor raw water quality.

The robots, called the Smart Water Assessment Network (SWAN), use water monitoring technology to collect data in real time. They are designed to resemble real swans to blend in with the natural surroundings.



The SWAN's in action.

The robotic swans will be deployed at Marina, Punggol, Serangoon, Pandan and Kranji reservoirs. It is one of the technological solutions PUB is adopting to more closely monitor water quality and provide better understanding of reservoir conditions in order to improve raw water quality.

The swans will be used to monitor different physical and biological compounds in the reservoirs, including pH, dissolved oxygen, turbidity and chlorophyll. The swans work by trawling particular areas of interest in the water body and wirelessly sending back data through cloud computing. Programmers will be able to remotely control the robotic swans, but the aim is to ensure they are as autonomous as possible, requiring just basic monitoring and operation, which can happen from anywhere with an Internet connection.



Koay Teong Beng from NUS remotely controls the robotic swans on Pandan Reservoir. (Photo: Jack Board)

The aim of the project is to ease the burden of water authorities in deploying limited manpower to physically collect samples from water bodies, particularly to areas that are difficult to reach.

Read more at <https://tinyurl.com/y9cv73z7>

AUSTRALIAN INDUSTRY STANDARDS – SKILLS WORKSHOPS



Australian Industry Standards Ltd (AIS) is the Skills Service Organisation (SSO) for the water industry and is tasked with maintenance of the National Water Package (NWP). This training package

comprises seven qualifications, 10 Skill Sets, 148 units of competency and associated assessment requirements and covers: water supply, sewerage, drainage services and pipeline transport (water).

The NWP Water Training Package provides the only nationally recognised Vocational Education and Training (VET) qualifications for occupations involved in: water industry operations (generalist, treatment, networks, source, irrigation, hydrography, trade waste), treatment (drinking water, waste water) and irrigation.

The Water Industry Reference Committee (IRC) is the key advisory group to AIS on matters relating to the NWP National Water Training Package. WIOA is represented with former President John Harris from Wannon Water the current Chair and George Wall is the Deputy Chair. WIOA actively participates in the Water IRC to ensure that both the qualifications and all the individual Units of Competence are current and appropriate for industry needs.

The major project for the Water IRC in 2017 was the review and development of the NWP50715 Diploma Water Industry Operations qualification including 25 associated units of competency. Information is currently being collected to inform a review of the qualification rules and units contained within Certificate II and Certificate III. A case for improvement and request for funding will be developed and submitted to the Australian Industry Skills Committee to allow this work to proceed in 2018/19.

Part of AIS' role in industry is promoting a better understanding of Training Packages. In November and December 2017, AIS hosted a series of Skills Development Workshops. The workshops were free and open to representatives from industry and training providers to attend.

The first of these workshops was held in Melbourne on 30 November and covered an overview of the National VET system and Training Package development process, insights into industry workforce trends, and a round table discussion on emerging skills needs

Further Skills Development Workshops are planned for 2018. These workshops will give participants the opportunity to share ideas on strategies for meeting workforce skills needs now and into the future.

For further information on upcoming training package skills workshops, the latest on industry trends and intelligence, priority projects and/or National Water Package updates, visit the AIS website:

<https://www.australianindustrystandards.org.au/training-packages/national-water-training-package/>

A TOOLBOX FOR EVALUATING BIOLOGICAL FILTRATION PERFORMANCE

Research Laboratory Services (RLS) is a Melbourne based company providing consulting and testing services to the water and wastewater treatment industries. In particular, RLS is a specialist in the monitoring and optimisation of biological filtration processes in Australia, and is internationally renowned for their extensive knowledge base using established and emerging analysis techniques for biological and physical media performance.

There is often confusion surrounding testing protocols to assess and optimise biological filter performance. All biological filtration processes are different, with different influent qualities and treated water quality objectives. Typical analyses include; Dissolved Oxygen, water plate counts, water ATP measurements, Biodegradable Dissolved Organic Carbon (BDOC) and Assimilable Organic Carbon (AOC), water organics analysis – DOC, UV254, colour, chlorine demand, DBP formation, and water inorganics analyses – metals and nutrients.

Biological filtration media analysis incorporates a range of techniques, including; media plate counts, media ATP measurements for rapid biological health assessment, DNA extraction and analysis of media biology, mineral content of the media, and media aging profiles including adsorptive capacity for activated carbon.

Regular analysis of full scale biological filter influent, effluent and media, along with RLS's expert data interpretation services will provide water utilities with recommendations to ensure economical biological filtration operation to meet target water quality objectives including reducing disinfection by-products in the distribution system and removing taste and odour compounds.



Full scale biological activated carbon filter process.

With long term media analysis, water utilities can be sure their biological filtration media is working effectively and allow asset managers to plan for media replacement as required without exposing a risk to public health.



Air Scour of a biological activated carbon filter.

RLS works with clients to tailor analysis and monitoring programmes to suit their needs, creating an effective toolbox for the evaluation of biological filtration performance. For further

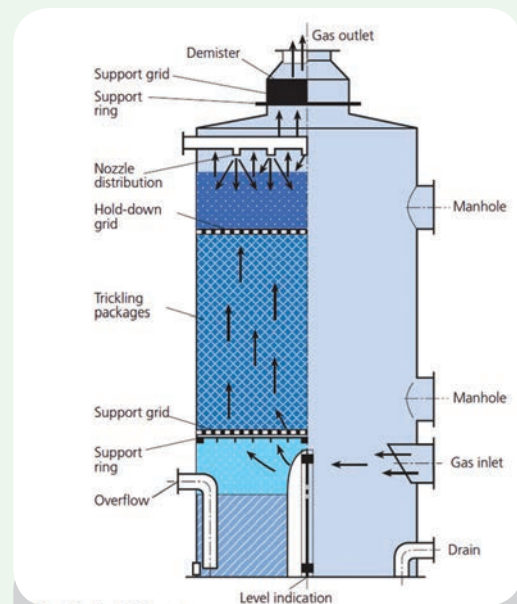
information on a toolbox to suit your needs, contact peta@researchlab.com.au.

PH CONTROL DURING DRINKING WATER TREATMENT

The water introduced into our drinking water system must meet the most stringent requirements concerning hygiene, as well as certain alkalinity and pH requirements to protect water pipes. To produce the drinking water of the required quality, there are many different treatment processes depending on the origin of water.

A broadly used procedure is the open aeration of raw water. The raw water can contain corrosion-causing carbon dioxide, which is driven off by aeration. Iron and manganese compounds may also be present, depending on the origin of the water. Aeration may be used to oxidise these, facilitating their removal via filtration.

In this process the raw water is sprayed through pumps and distributed over large surface packages in so-called trickling towers. To increase the efficiency, the aeration space can be blown with air from below in a counter-flow process.



Principle of a trickling tower.

When the raw water has an excess of carbon dioxide and is not in lime/carbon dioxide equilibrium, the pH value of raw water must be increased. The water is ventilated to saturate it with Oxygen and reduce the solubility of the carbon dioxide. Thus the carbon dioxide which is partially dissolved as carbonic acid when in equilibrium, is driven off. This increases the pH from approximately 6.5 and can be increased to 7.5. To optimise the energy inputs of the pumps, the pH value is continuously measured after the aeration process. At each aeration tower the aeration pumps (and thus the amount of air) are controlled via the pH value.

Depending upon the number of measuring points, pH sensors and transmitters can be selected accordingly.

For a detailed application note, please contact ALVI Technologies by e-mail at: info@alvi.com.au. To find out more, visit the website at: www.alvi.com.au

LOW-POWER, LOW-COST DATA ACQUISITION FOR BETTER RETICULATION NETWORK MANAGEMENT

Low Power Wide Area Networks (LPWANs) are based on new types of radio communications which have evolved over the past ten years or so, to collect small amounts of data from large numbers of devices distributed across wide areas. Although widely known in the context of Smart Cities, it is actually in the water sector that LPWANs are having their biggest impact, especially here in Australia.

It is likely that many Operator readers have heard of Automatic Meter Reading (AMR), an activity which uses some form of radio technology to read water consumption data from domestic water meters much more frequently than traditional manual meter reading. Well, LPWANs have been playing a major role in this area, being just about the only sensible choice for municipal scale AMR available today.

Typically, an AMR system that uses LPWAN for data collection reads meters every hour and sends the data to the water utility on a daily basis. In some case it can be sent as soon as the meters are read.



Water meter fitted with LPWAN AMR device mounted in a pit.

AMR or water consumption data collected through fixed networks such as Taggle's LPWAN is helping water service providers (WSPs) to save water by identifying water leaks on customers' premises and within reticulation networks where so-called Non-Revenue Water (NRW) is of major concern.

Minimising NRW is of great interest to water utilities from a cost perspective when you consider that a lot of money has been spent treating and pumping this water before it disappears through a hole in a pipe. Of equal, if not greater concern to the utility is the damage such leaks cause in pipelines. Catastrophic failure of a water main is a serious and expensive matter which draws heavily on water authorities' resources, especially regional ones.

In the longer term, water consumption data is having a big impact on major investment decisions.

In 2012, Mackay Regional Council in North Queensland identified that they would need to invest \$100M in a new water treatment plant by 2020 to cope with their community's growing demand for water. Data from their new LPWAN-based AMR system, along with community engagement and education programs has allowed them to defer the investment until 2032 or possibly later. This has helped the community save tens of millions of dollars in capital costs.

In South Australia, Adelaide has experienced numerous high-profile pipe bursts which have caused havoc in the city. A recently installed AMR system using LPWAN, along with other innovative technology, is helping the local utility to better monitor its reticulation network and address problems before they get out of control.

One aspect of Low Power Wide Area Networks which is gaining traction within Australia's water sector is their use to gather a wider range of data for use in Supervisory Control and Data Acquisition (SCADA) systems.

SCADA systems, historically, have employed relatively expensive sensors, instruments and communications methods to collect data from around the water supply system. Because of the high cost, most of the data collected has been from between the point of raw water supply and service reservoirs, including the water treatment plant. Most water utilities have collected little or no data beyond the service reservoirs because it has been just too expensive to do any meaningful monitoring there.

For many WSP's, the reticulation network beyond the service reservoirs represents as much as 60% of their overall network assets. That's a lot of assets with not a lot of monitoring!

Low cost data from the reticulation network, from domestic and district water meters as well as pressure and water quality sensors, are providing water supply managers with new visibility on what might be called dark assets, assets about which they have known very little in the past. It is early days yet, but the potential for major benefits in this area is huge.



Residual Chlorine Sensor fitted with LPWAN transmitter.

To make it easier for LPWAN-collected data to be used with SCADA systems, companies such as Taggle have established compatibility with what's known as DNP3. It is a communications protocol widely used in the water sector to facilitate the acquisition of data from sensors and instruments and the control of equipment such as pumps and valves. Compatibility with DNP3 means that getting data from LPWAN-connected sensors into SCADA systems is extremely easy.

To put all of this in a nutshell, Low Power Wide Area Networks are helping water utilities measure what they haven't been able to measure before, economically. Coupled with the old adage that says "If you can't measure it, you can't manage it", LPWANs are opening the door to a whole new world of water utility network management.

For more information on Low Power Wide Area Networks and water utility applications contact Mark Halliwell at Taggle Systems on +61 2 8999 1919 or visit the website www.taggle.com.au

NEW MEMBERS

Welcome to the following people and companies who have recently joined our Association as a Member or Corporate Supporter.

New **Individual Members** include:

Shane Maurer, Paul Walker, Emanuel Andrawos, LaToya Cameron, Sam Jones, David Larkins, Manu Gravatt, Hayley Paton, Steve Crombie, Cliff Wilson, Ethan Stripeikis, Thomas O'Brien, Kristen Smyth, Simon Caldwell, Ben Dale, Erin Wimhurst, Stephen Hall, Richard Grohmann, Philip Ardern, Trish Keat, Tayla Cartwright, Mark Lowe, David Lowe, Stephen Kurian, Mick Kelly, Les Hart, Damon Yeats, Slim Sommerville, Travis Poole, David Mason, Ali Gharaibeh, Ben Hill, Jarad Brookes, Glenn Kinlyside, Tim Mangold, Steve Catterall, Glen Arnold, Jeff Kidd, Paul Dixon, David Simmons, Paul Cousins, Kate Simpson, Colin Storey, Chris Devit, Alex Norman, Anub Nair, Chris Hogan, Matt Hardy, Joe Taylor, Mandy Murchison, David Brooker, Daniel McGregor, Oliver McNutly, Lance Stevenson, Daniel Blyton, Rodney Bull, Boyd Stanley, Steven Ensor, Jared Layland, Lucy Allsop, Russel Lyne, Lu Hubing, Gavin Morgan, Leslie Briggs, Dean Harrington, Jordan Power, Chris Reilly, James Cameron, Tara Callingham, Joe Pollock, Paul Whitlock, Tony Bosch, Tyson Coombes, Brett Sharp, Zeeshan Pirzada, Paul Fishenden, James Meakin, Sarah Cumming, Paul McLure, Chris Wendt, Charles Krieger, Kruse Rothnie, Stephen Lanigan, Gregg Renwick, Nick Andrusyk, Linda Hardy, Lillie Hardy, Stephen Murphy, Daria Surovtseva, Frank Richard, Glen Prowse, Greg Brown, David May, Adrian Luke, Grant Walker, Owen Minett, James Locke, Joshua Radke, Jon Francis, Amanda Brown, Arnold Keizer, Karey Wills, Marco Bottari, Sarah McLaren, Tek Foo, Paul Cooper, Joe Zahra, Rob Tonna, Les Shingles, Mick McGregor, Luke Summers, Joseph Cooley, Sam Parkes, Malcolm Hill, Scott Ahearn, Vaughan Grey, Richard Barratt, Steven Lamble, Keith Payton, Al Law, Tony Smith, Casey Staines, Amira Harawartha, Rui Yang, Clinton Crocker, Mitch Palmer, Mick Todd, Greg Searle, Tom Dippel, Marie Jones, Kim Fisher, Jack Schill, John McGrath, Tom Kenyon, Sean Watteau, Shane Prince, Jacob Milhuisen, Jack Dodds, Dan Spiller, Mark Sparrow, Peter Vardanega, Gaudern Gray, Gary Harris, Doug Kewish, Andrew Ryan, Shane Griffiths, Jeff King, James Collett, Glenda Kelly, Tom Stiles, Marc Hamilton, Simon Uren, Yousuf Khan, Simone Calaby, Russell Delahunty, Dylan Merrett, Sean Johnston, Robert Ryan, Nathan Williams, Carsten Berberich, Andrew Harris, Fawzi Saldin, Javier Artal, John Beck, Rimom Gergawy, Sandip Chhasatia, Carla Begg, Ross Clements, Dhaval Jani, Rongtao Liu, Jaypal Mehta, Rama Mohan, Max Ogilvie, Chetan Patel, Matiur Rahman, Mariam Moubarak, Derryn Soutar, Govind Singh, Dylan Yong, Denny Phillips, Russell Fraser, Jason Kilpatrick, Jonathan Hoy, Kevin Stevens, Mark Laurenzi, James Footner, Graham O'Byrne, Caitlin Aguirre, Ben Callahan, Matthew Dibben, Aaron Marschall, James Portlock, Andrea Gonzalez Torres, Stephen Glenney, Mark Lawley, Ian Wallace, Liz Knight, Doug Slocombe, Mark Coleman, Peter Turner, Rory Crayford, Ethan Leeds, Ric Attrill, Shane Mitchell, Jude Fernando, Allan Busoli & Craig Calcagno.

New **Utility Corporate Members** include:

Adelaide Aqua.

New **Corporate Members** include:

Ebara Pumps Australia, Aymroo, Construct Civil Limited, Turbo Compressor Selection & Justification, Envirosonic, Smartstream Technology, NHP Electrical Engineering Products, ADM Instrument Engineering, HRS Heat Exchangers, Spoutvac Industries, Alga Enviro, CDEnviro, Watercam Group & Genbina Engineering.

COMING EVENTS

2018

1 March	PASS Award applications close
3 & 4 March	WIOA AGM and Weekend Seminar , Ballarat
6 March	WIOA Talks – Algae webinar
9 March	Queensland Charity Bowls Day , Yandina
20 July	Kwatye Award applications close

2018 Conference and Exhibition Schedule

11 & 12 April	12th WIOA NSW Water Industry Operations Conference & Exhibition , Tamworth
4 - 12 May	WIOA Tour to New Zealand and WIOG conference , Palmerston North
6 & 7 June	43rd WIOA QLD Water Industry Operations Conference & Exhibition , Logan
5 & 6 Sept	81st WIOA VIC Water Industry Operations Conference & Exhibition , Bendigo



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NEXT EDITION

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