



Water
Treatment
Technology

The Smarter Way to
Make Water Safe



AUSTRALIAN®
WATER
ASSOCIATION



Water is our most precious resource and is essential to sustain human life. It is also a critical component of a healthy environment.

The quantity and quality of water are closely linked. Water quality is typically defined by its chemical, physical and aesthetic characteristics. A healthy environment is one defined by having a water quality which supports a varied community of essential organisms and protects public health.

Water quality influences the way in which communities can allocate and use water, the key allocation of water is for drinking purposes. Once this is satisfied the community decides how it will allocate what remains for activities such as swimming, irrigation, domestic, agricultural and industrial purposes – sometimes these allocations are skewed by economic considerations.

A key factor in determining water allocation is its ability to meet the public health constraints which determines its availability for human consumption. Whilst the world has large quantities of water, much of it suitable for sustaining ecosystem, recreational uses, tourism, farming, fishing and mining, the amount available for human consumption is extremely limited.

Recognition of this fact has been one of the key drivers behind Hydro-dis® – finding “The Smarter Way to Make Water Safe” to increase the amount of water available for human consumption and making the water used in other applications as safe as possible. The Hydro-dis® technology is a cost effective and environmentally friendly technology which reduces our environmental foot print and cost effectively creates water suitable for human consumption.

A Unique Technology

The Hydro-dis® system is a unique water disinfection technique that uses the electro-catalytic break down of water to instantly destroy water borne micro-organisms including micro-flora, simultaneously converting chloride ions into chlorine leaving a measured residual disinfection in the treated water giving a secondary disinfection ensuring sustained microbiological control.

The Hydro-dis® system replaces traditional disinfection techniques such as chemical dosing (Sodium Hypochlorite and Chlorine Gas), Ultra Violet irradiation and Ozonisation with a cost effective, environmentally friendly, modular and portable system.

This refined and improved technology can now be applied to a wide variety of water use applications ranging from Potable (drinking water) through to waste water (sewerage) and any application in between. The Hydro-dis® technology has significant advantages over traditional methods in rural and remote sites

as it removes the need to transport and store hazardous chemicals around the country.

Specialist applications include the control of biofilms & algal blinding of bore columns, disinfection of water storages and ornamental water bodies.

The Hydro-dis® system is specifically designed to be energy efficient, allowing isolated and remote applications to generate the power needed in-situ by solar, wind or PipePower™ if required.

As there are no moving parts, minimal maintenance and operator input is required. Unlike many other disinfection techniques the Hydro-dis® system has recyclable and reusable componentry, therefore reducing landfill and also minimising the frequent replacement of costly components.

Our history

In 2010 an Australian company owned by Mark Carey purchased the intellectual property, trademark and assets associated with the Hydro-dis® technology. The research and development of the technology was begun in 2002 by our Chief Technical Officer Rob Richardson, since 2010 Mark and Rob have continued the focus on developing smarter ways to make water safe. This focus has resulted in the Hydro-dis® technology being now recognised as a leader in finding sustainable solutions and cost effective ways to make water safe for its intended use and helping our clients to reduce their clients environmental footprint.





Technical Advantages

The unique and proven Hydro-dis technology has applicability across all water disinfection and treatment applications including but not limited to:

- potable water
- waste water,
- evaporative cooling systems
- aquaculture
- winery waste, and
- recreational applications like swimming pools, spas and water features.

Some key features and benefits include:



Fully Automated

Requires only routine checking and servicing.



Cost Effective

operates at extra low voltage improving operational safety and reducing maintenance costs.



Efficient

Significantly improves the efficiency of oxidation reducing water discharge and hazardous chlorinated by-products compared with chemical dosing.



Easy-integration

Easily integrated to existing water circuits and suited to low volume applications.



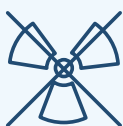
Low Maintenance

Longer service life and reduced operating / running costs.



Government Approved

Strong links to Australian and International Governments through ongoing applications and projects.



Chemical-free Process

Reduces the hazards of disinfecting water with no need to transport nor store chemicals on site.



Clean Energy Options

Solar/in-situ/wind powered options
- for rural with no or unreliable power.

Case Study 1: Iron & Manganese Removal From Bore Water

The Western Australian Water Corporation was having significant problems with the quality and amenity of water being supplied to a number of regional communities in the mid-west region due to the high levels of Iron and Manganese in the ground water supply.

Background

In November 2015 the Western Australian Water Corporation undertook a trial of the Hydro-dis® technology to determine if the technology was able to improve the removal of Iron and Manganese from bore water as part of the pre-treatment process. Historically large quantities of chlorine gas in conjunction with sodium hydroxide and filtration were used to oxidise the unwanted metals. Whilst this process improved the water quality, the final water amenity was still rated as poor. Post treatment water also required chlorination prior to storage and subsequent reticulation and the Hydro-dis was used to carry out this function without the need for chlorine chemical dosing.

Challenge

To improve the efficiency of oxidation of Iron and Manganese from the bore water feed to allow removal using the existing filtration system. To provide consistent post treatment disinfection and stable quality water in response to the large seasonal variability in demand by the township.

Outcome

The Hydro-dis® system was successfully commissioned in July 2023 and is now the world's first continuous electro-chlorination system for metal oxidation and removal.

The commissioning demonstrated that by using the Hydro-dis® technology, the Water Corporation were able to increase the rate of Iron removal from 75% to 100% and Manganese removal from 36% to 65% confirming that the Hydro-dis® technology successfully eliminated the need to use and therefore transport and store hazardous chlorine gas while improving final water quality.

Following the success of the Hydro-dis® technology to improve the removal of metals from ground water, the Water Corporation commissioned the construction of a mobile Hydro-dis unit to assess applicability in off-grid remote site applications.

The success of this project has resulted in a cooperative research project between Water Corporation, University of Queensland, NT Power & Water, Dematec Automation and Hydro-dis Australia was formed to fund the research and development and to demonstrate the applicability of the Hydro-dis® technology for the removal of nitrate, uranium and arsenic in ground water in the northern areas of WA and NT. The project is progressing well with a Beta prototype under construction for site deployment in late 2023. For more information refer to Case Study 2.



Case Study 2: Nitrate Reduction in Bore Water Research Project

Collaborative research into the use of the Hydro-dis® technology to reduce nitrate contamination in ground water.

Background

Much of the groundwater supplied for drinking in NT and WA has significant nitrate contamination at concentrations exceeding WHO limits. The Western Australian Water Corporation, NT Power & Water, NT Government and the University of Queensland have joined with two SMEs, Hydro-dis and Dematec Automation to investigate the reduction of nitrate present in ground water using electrolysis. Hydro-dis was chosen as the technology supplier because of previous work with Water Corporation on the treatment of ground water for the removal of contaminants. A successful project outcome will result in the ultimate deployment of the technology across NT and WA in rural and remote sites.

UQ are undertaking the research component using Hydro-dis cells and the early laboratory testing has been very positive and has led to a Beta prototype being constructed for deployment in NT late in 2023. The early results indicate that significant reductions in nitrate can be achieved utilizing renewable energy, primarily solar power. This is a significant factor and when combined with no waste stream as the nitrate is converted to nitrogen gas, the technology has great potential regarding water conservation and security. In tandem with the nitrate

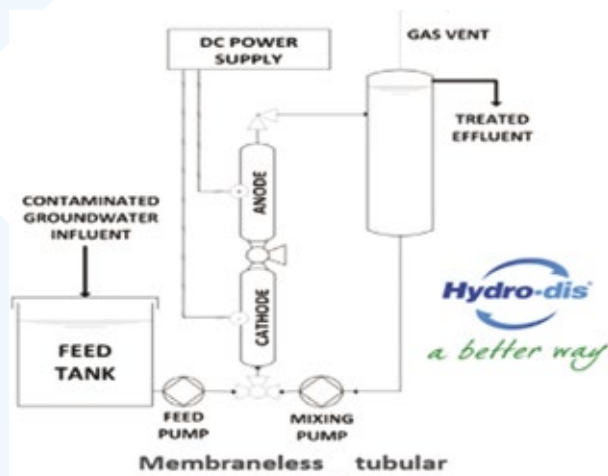
reduction, the lowering of naturally occurring uranium and arsenic contamination using the Hydro-dis cells is also being investigated by UQ and early results are also very promising. Another advantage in using the Hydro-dis technology is that the water is disinfected by the process and a measured free chlorine residual is produced by the Hydro-dis cells from conversion of the naturally occurring chloride ions present in the feed water. This is also a significant advantage over alternate nitrate reduction technologies as no hazardous chemicals are required for either the nitrate reduction or the chlorination of the treated water.

Challenge

To improve the efficiency of the nitrate reduction process by modification of the cell design and operating parameters and to develop a cell specific for the uranium and arsenic reduction.

Outcome

Although it is early in the project development stage, very positive results have been achieved to date and the project is looking to deliver a working design suitable for deployment across northern Australia.



Case Study 3:

Mahatma Gandhi Medical College

Background

Mahatma Gandhi Medical (MGM) College has a group of Major Hospitals in the Indian city of Indore. Hospitals operated by MGM College, Indore are Chacha Nehru Bal Chikitsalaya (CNBC), Cancer Hospital, TB Hospital, Gynaecology Hospital etc. It has been identified that infectious diseases (viruses/bacteria) were spreading through the infected water supplied to washrooms and common areas. Testing indicated that due to a lack of disinfection, water supplied to the washrooms and other common areas was harbouring pathogens and had a high bacterial load. This can pose serious health risks, especially for immunocompromised patients. Proper water treatment, disinfection protocols, and regular monitoring are crucial to ensure the safety of patients, staff, and visitors in healthcare facilities.

Challenge

Disinfecting hospital water presents challenges due to the diverse range of pathogens, including drug-resistant bacteria and biofilms. These require advanced treatment methods to ensure water safety. Additionally, maintaining a balance between effective disinfection and minimizing harmful byproducts is vital. Un-skilled labour and storage of hazardous chemicals and disinfectants presented additional challenges for managing the problem.



Outcome

Regular monitoring and technological innovations play a crucial role in addressing these challenges and safeguarding patient health. The Hydro-dis® technology was installed in the hospital water circuit leading to improved patient safety and reduced infection risks. It safeguards immunocompromised individuals and staff from waterborne diseases. Proper water treatment fosters a healthier environment, enhances overall hygiene standards, and supports the hospital's commitment to providing top-notch healthcare services. The Hydro-dis® technology has been installed in the CNBC, Cancer Hospital, TB Hospital, and MTH in Indore supplying the whole water supply system in the facilities disinfected and pathogen free water. The system has maintained the desired FRC at the point of use i.e., in washrooms and other common areas significantly reducing the risks of the spread of highly infectious disease.





Water
Treatment
Technology

The Smarter Way to
Make Water Safe

Mark Carey

Chief Executive Officer

mark@hydro-dis.com.au

+61 400 636 227

www.hydro-dis.com.au

A unique and proven water treatment solution