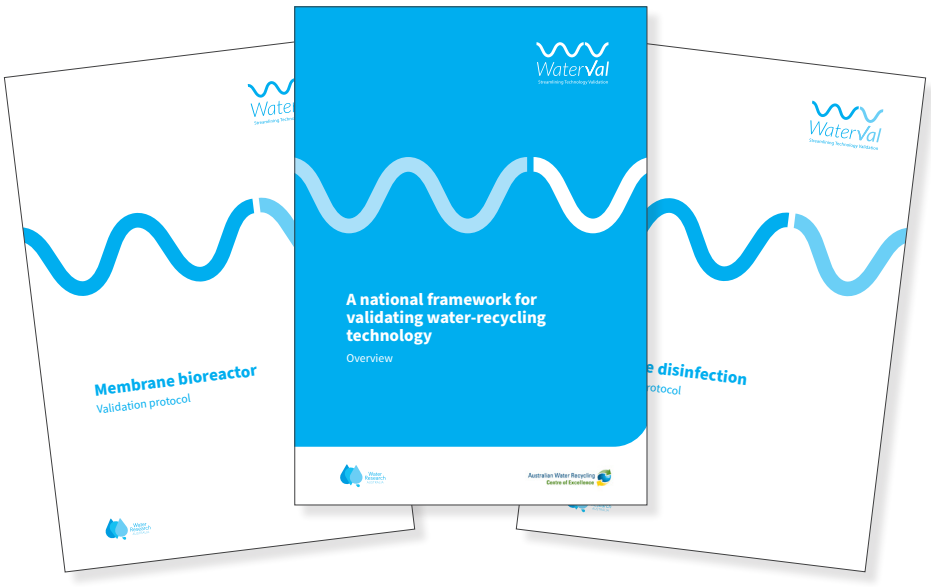
WaterVal®

Streamlining Technology Validation

Design, Operate and Deliver with Confidence

2025 PROPOSAL

Water Research AUSTRALIA



What is WaterVal?®

WaterVal® is a nationally endorsed, research-backed framework that enables the water industry to validate treatment processes with confidence. It provides a consistent, scientifically robust approach to confirming that water treatment systems can effectively remove contaminants—ensuring the protection of public health and the environment. WaterVal® supports the entire treatment journey—from catchment risk assessment through to verification and reporting—streamlining processes and reducing uncertainty.

Based on protocols with 9 essential elements, which is grounded in the latest research and industry best practice, WaterVal® is adaptable across a wide range of contaminants, source waters, and treatment technologies.

Over the last three years, WaterRA, thanks to the support of water industry partners, has continued to develop the WaterVal® program - adding more background documentation and new validation protocols for additional treatment processes. This proposal presents the investment and operational framework needed to sustain and advance the WaterVal® program. It ensures that water utilities, operators, designers, consultants, contractors, and regulators can continue to rely on WaterVal® protocols with confidence in both treatment processes and water quality outcomes.

What is Validation?

Validation is the substantiation of the ability of a water treatment process to effectively remove contaminants. It involves obtaining objective evidence that control measures effectively control the hazards. This includes verifying the operational criteria and associated critical limits that are necessary to protect public health and the environment. The performance of a water treatment scheme is based on the design of the individual treatment processes and the technology used. Validation guidance and protocols are grounded in the latest research findings and industry best practice to meet the requirements for validation and demonstrate the contaminant reduction for individual treatment processes.

Why Validation Matters?

Treatment validation is a critical component of water safety management and is a core component of the Australian Drinking Water Guidelines and the Australian Guidelines for Water Recycling. These guidelines are based on a risk framework and set water quality requirements, including a microbial health-based target. These water quality targets are then met by validating the treatment process. While these guidelines describe the concept of and requirement for validation they do not describe how to do it, but rather refer to published validation guidelines such as WaterVal® and USEPA.

The Industry Challenge

There is currently no universally agreed or formally recognised framework or standardised protocols for confirming performance of water treatment processes. This leads to duplication in effort, increased costs and delays in projects, and is an obstacle to more efficient processes, reduced costs, and an increased confidence and accelerated access to the use of alternative water supplies. It also creates uncertainty for technology providers as the protocols for demonstrating and claiming removal credits vary between jurisdictions.

Many water treatment processes that are currently in use are not permitted to claim log reduction values (LRV) or could potentially claim higher LRV. This costs water utilities and customers millions of dollars of unnecessary operational costs and capital spending on additional treatment steps.

Additionally, as we move to secure water supplies and more resilient water systems in the face of climate change and population growth - this requires diversified water supplies, which in-turn means new water sources, new treatment processes and validation of the performance of these.

Key Industry Needs

- Independent endorsement of treatment technologies
- Consistent validation approach nationally and internationally to support global technology suppliers
- A nationally consistent and agreed process that is transparent, independent and reduces complex and onerous design and commissioning (particularly for small schemes)

This is where WaterVal® steps in

WaterVal® is a universal validation approach and resource offering a clear, consistent framework that fills this gap and enables utilities and regulators to confidently assess treatment performance.

What WaterVal® Offers

Crediting Contaminant Removal

WaterVal® provides a contaminant removal crediting framework, assigning LRV to a particular treatment process for achieving pathogen or chemical reduction based on ongoing measurements of key parameters and surrogates. This enables transparent and defensible claims of pathogen and chemical reduction performance.

Streamlining the Entire Treatment Journey

While the focus of WaterVal® is on the removal capability of a treatment process it streamlines all phases of water treatment from initial catchment risk assessment to verification and reporting. It simplifies complex processes, reduces uncertainty, and ensures alignment with regulatory expectations.

A Collaborative, Trusted Framework

WaterVal® was developed in partnership with regulators and key stakeholders in the water industry to clarify requirements for the design, operation, and reporting of treatment technologies. It is recognised internationally, including in the US, as scientifically robust and defensible guidance for validating treatment processes.

Comprehensive Protocols for Diverse Needs

WaterVal® is underpinned by Validation Protocols for water treatment processes. The supporting protocol template outlines nine standard elements that must be addressed within each protocol to ensure consistency and uniformity in the approach to validation.

WaterVal® Protocol Elements

1. **Identify the mechanisms** of contaminant removal by the treatment process unit.

2. **Identify the target contaminant**, or appropriate surrogates, that are the subject of the validation study. Ensure that the target contaminant or surrogates are present at an appropriate concentration.

3. **Identify the influencing factors** that affect the efficacy of the treatment process unit to reduce the target contaminant.

4. **Identify the operational monitoring parameters** that can be measured continually (ideally) and that will relate with the reduction of the target contaminant or class of contaminants.

5. **Identify a validation methodology** to demonstrate the capability of the treatment process unit.

6. **Describe a method to collect and analyse** data to formulate evidence-based conclusions.

7. **Describe a method to determine the critical limits** as well as an operational monitoring and control strategy.

8. **Describe a method to determine the LRV** for each contaminant group or class in each specific treatment process unit performing within defined critical limits.

9. **Provide a means for re-validation** or additional onsite validation where proposed modifications are inconsistent with the previous validation test conditions.

The WaterVal® validation protocol template (2015) was an output of the Australian Water Recycling Centre of Excellence (AWRCoE - 2011) and provided the structure for the development of treatment validation protocols that underpin WaterVal®. WaterVal® is not a new, additional layer of regulation or guidelines. Regulators are responsible for scheme approval and assessment of acceptable validation requirements. WaterVal® simply provides a structured process by which the water industry stakeholders can collaborate to develop and agree on consistent scientific approaches to and requirements for validation of treatment technologies.

WaterVal® answers key validation questions at each stage of the treatment scheme lifecycle

While the focus of WaterVal® is on the removal capability of a treatment process it streamlines all phases of water treatment creating cost and time benefits for utilities.

Source water assessment

COST BENEFITS $

TIME BENEFIT

WaterVal® Answers

- What to monitor?
- What is the treatment objective?
- What are the contaminant hazards?

Treatment selection and design

COST BENEFITS $

TIME BENEFIT

WaterVal® Answers

- What treatment processes are most effective?
- What contaminants does a treatment process remove, and how do they achieve this removal?
- What is the most suitable treatment train to meet the treatment objectives?
- What log removal credits (LRV) can be claimed for each treatment process?

Regulatory Approval

COST BENEFITS $

TIME BENEFIT

WaterVal® Answers

- What are appropraite removal credits for technologies?
- Can the treatment train design meet the regulatory removal requirements?
- How will the removal be demonstrated to the regulator?
- What standardised protocols for contaminant removal to apply
- What data analysis will be required to claim credits?

Commissioning

COST BENEFITS $

TIME BENEFIT

WaterVal® Answers

- What indicators and surrogates will be used to provide evidence of removal?
- What performance targets will need to meet regulator approval?

Operation

COST BENEFITS $

TIME BENEFIT

WaterVal® Answers

- What procedures need to be followed to verify the removal?
- What indicators will be monitored to maintain the removal?
- What is the evidence in real-time that the treatment proceess continously meets performance objectives?
- What operational changes trigger the need for revalidation?
- How to analyse data to confirm removal?

Verification and Reporting

COST BENEFITS $

TIME BENEFIT

WaterVal® Answers

- Was the treatment effective?
- What indicators will be monitored to confirm objectives are being met?
- What reporting of monitoring is requried to demonstrate performance?
- How is this best reported to stakeholders?

The WaterVal® Research Program

Thanks to a network of water industry partners, since July 2023 WaterVal® has been operating under a 3-year funding agreement. WaterRA has created a research program under the guidance of a WaterVal® Administrator Group and a Protocol Development Group consisting of technical treatment experts from all water industry sectors.

The aim is to develop validation protocols for the broadest range of:

- **CONTAMINANTS**
- **SOURCE WATERS**
- **TREATMENT BARRIERS**

Currently, the program includes a portfolio of projects that have been prioritised by the project partners. There also plans to review existing protocols, and develop new protocols for the removal of contaminants for a greater range of water treatment processes.

Existing Protocols

- UV Disinfection
- Reverse Osmosis and Nanofiltration
- Chlorine Disinfection
- Membrane Bioreactor
- Ozone Disinfection

The validation protocol template has been revised and updated to ensure that it reflects current validation knowledge, and that all protocols are developed in a standardised manner.

WaterVal® resources are now available through a WaterRA managed website providing ready access to validation protocols and supporting validation resources.

WaterVal® has developed validation guidance to build knowledge and understanding of validation science and its importance in water treatment schemes. This guidance along with treatment protocols, are being made accessible through online training.

WaterRA has also formed a partnership with CalVal, a Californian program to develop uniform guidance for treatment credits for indirect potable reuse in California. Within the US, WaterVal® is accepted as robust and defensible guidance for water reuse projects, and the CalVal guidance will follow the WaterVal® approach and support the development of future WaterVal® protocols.

The Research Program

PROJECTS UNDERWAY	PROJECTS UNDERWAY	PROJECTS IN DESIGN/FUNDING	FUTURE PROJECT PRIORITIES
Validation Protocol research	Validation supporting research	Validation Protocol research	Validation Protocol research
Ultrafiltration protocol guidance	Validation guidance	Activated Sludge	Ultraviolet disinfection review
Granular Media Filtration	WaterVal® Protocol Review	Chlorine disinfection review	UV/AOP
Reverse Osmosis Chemical Validation	UV/Chlorine AOP in potable reuse	Membrane Bioreactor review	Ozone/BAC
Pathogen removal in Membrane Bioreactors	Enhanced source water monitoring for water reuse	Ultrafiltration	Strainers
		Reverse Osmosis Review	Reservoirs as buffer zones
			Groundwater as buffer zones
			Natural systems
			New Technologies

What our partners are saying

WaterVal® is essential to the design and successful operation of water treatment systems relying on achieving health-based targets (HBTs) and water recycling programs, including purified recycled water (PRW), relying upon achieving log reduction values (LRVs) for pathogens and chemicals.

The value of WaterVal® is its independence and the rigor under which the protocols are generated, leading to confidence of designers and utilities that data generated in accordance with the WaterVal® protocols may be trusted.

Dr Bruce Atkinson | Beca HunterH2O

Going back to the original AWRCoE and NatVal, Veolia has been a strong supporter and advocate for the development of treatment barrier validation protocols for pathogens. Veolia was involved in peer review of the original NatVal protocols, as well as a project partner on the AWRCoE-funded Robust Recycling project. We see the ongoing evolution of WaterVal® as a critically important way to streamline and simplify treatment barrier validation and performance verification, for protection of public health.

Veolia

WaterVal's protocols have proven to be a valuable resource in assisting our California-based clients with attaining regulatory approval for their purified recycled water projects. The nine-step protocol template clearly demonstrates how a treatment technology such as chlorination should be credited with the appropriate pathogen LRVs.

Trussell
USA

I have always been a strong supporter of having a National Validation Framework. In my current role at Sydney Water and previous roles at IPART and NSW Health I can see the benefits of having a consistent approach to validation. Especially the development of clear guidance documents that can be implemented by utilities and recognised by regulators. The work being undertaken as part of the WaterVal® program is a key element of this.

Kaye Power | Sydney Water

For complex water quality projects, such as Purified Recycled Water, confidence in finished water quality is paramount. Engineers, water utilities, and regulators all need that confidence. Lack of clear guidance (Validation) for treatment and monitoring systems results in slower project development, addition of unnecessary safety factors (and thus cost), and risk of installing equipment that (a) may not meet the performance goals or (b) may not be approved by the regulators. Further, lack of Validation presents a public challenge, as project naysayers can point to the lack of certainty as justification for an unsafe application. WaterVal® helps to resolve all of these challenges.

Carollo
USA

Validation of various treatment technologies used for recycling applications has been a regulatory requirement for any of our schemes and understanding the practical and technical nature of these requirements for the chosen treatment technologies has been invaluable. It would be great to have a national baseline for this as each state does do things slightly differently. That's why WaterVal® is so important – consistency is key. It will also help treatment technology manufacturers to know what the goal posts are, which can only help increase recycling application in Australia in the future.

Dr Stacey Hamilton | Busselton Water

NWRI works alongside practitioners, utilities, regulators, and researchers to create new sources of healthy water. Our experts have developed guidance that has advanced water reuse practices worldwide. Building on the trailblazing foundation of WaterVal, the CalVal initiative is establishing practical, technically based validation guidance that helps stakeholders understand and communicate the performance of potable reuse systems and their component treatment technologies. California regulators are actively collaborating with CalVal, based on their shared needs and to continue to the significant impact created through WaterVal® since it's inception.

National Water Research Institute
USA

Melbourne Water recognises that robust and practical treatment validation protocols, that are widely supported by the water industry and regulators, are a prerequisite for delivering safe and reliable drinking water and wastewater services. As such, Melbourne Water is strongly supportive of WaterVal, which brings together global expertise to advance the science and practice of water validation in a manner which is collegiate and collaborative.

Nick Crosbie | Melbourne Water

WaterVal® has been essential in helping us ensure our water treatment processes meet the necessary safety standards. Its standardised validation methodologies give us confidence in managing hazards, reassuring our customers that their water is safe. From a design perspective, it helps us understand what's achievable and ensures technical solutions are neither over- or under-designed. It also supports decision-making when exploring new water sources, giving us confidence in selecting the right options.

Nick Swain | SA Water

WaterVal® aligns with the ADWG approach for water utilities to demonstrate treatment targets as a LRV requirement. The framework and protocols set out a recognised pathway and practical process for the validation of water treatment technologies for the production of safe water, in particular for pathogens. This is valuable in terms of providing certainty and consistency across the water industry.

Seqwater

Ensuring WaterVal® benefits continue to be experienced

WaterVal® is intended to be a long-term sustainable resource for the water industry. The ongoing provision and maintenance of the WaterVal® research program and protocol development will save many millions of dollars in operational costs and capital investment and streamline future scheme development and approval. In recognition of these significant savings, it is proposed that the water industry fund a further 3-year program to continue the ongoing development and maintenance of WaterVal®.

These funds will be overseen by WaterRA, the owner of the intellectual property, who will also provide the ongoing management of the program under the direction of the WaterVal® Administrator Group.

The budget required is $450,000:

$150,000 per year for 3 years, July 2026 to June 2029, and includes a 0.5 FTE allocation for WaterRA to administer the program. The funding will also support travel, related events, website updates and training development.

Funding for protocol development research expenses will be shared with the industry, nationally and internationally, via Requests for Support, as research needs and protocol development projects are developed and prioritised.

Through the last 3 years of the current WaterVal® research program, seed funding has been available to support the initiation of new projects. WaterRA would like to see this continue and will be dependent upon the final funding raised. Funds raised above the budgeted $450,000 will be allocated to research projects.

As we look for support across the industry to raise the required funds, WaterRA will also continue to explore sustainable funding options with national and international bodies.

waterra.com.au/waterval

WaterVal®

Proposed funding targets for 3 years July 2026 to June 2029

Utilities

$100,000-$300,000

$30,000-$100,000 each over three years

State and territory agencies

$100,000

$30,000 each over three years

Industry associations, suppliers and consultants

$100,000

$30,000 each over three years

Note: Funding can be contributed in a lump sum or by financial year.

Expressions of interest to be made to:

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