

HIGHLIGHTS FROM THE TECHNICAL COMPETENCY BENCHMARK PROJECT

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ABSTRACT

The Water Research Australia (WaterRA) Technical Competency Benchmark project has brought together industry, regulators, and water associations through a major collaborative effort, to develop a nationally recognised technical competency benchmark. This project aims to align technical competency training to water industry operator roles and responsibilities. The Benchmark has provided reference to relevant accredited and non-accredited training needed to achieve minimum water industry operator technical competency. The Benchmark has been trialled nationally across urban, regional, and small utilities. The project wrapped up at the end of 2023, with the final version of the Benchmark report to be released via the WaterRA website.

The second phase of the project ‘Lessons from experienced operators’, will run through to August 2024. This phase of the project presents an opportunity to engage with frontline operators to understand their workplace experiences. We aim to hear from operators about some of the ‘right decisions made at the right time’, and to share openly their experience. Learning from their stories and with the benefit of hindsight, how greater emphasis on technical competency can lead to better operational decisions being made and why. In doing so, further evidence is obtained to support/inform industry regulators and utilities about frontline operator minimum competency standards and the importance of ongoing professional development.

1.0 INTRODUCTION

1.1 A Technical Competency Benchmark for Water Industry Operators

Despite long-standing evidence pointing to the need for a defined minimum standard for water industry operator technical competency, application of the training and competency requirements set out in Australian water services regulations and guidelines varies widely across the states and territories. In the absence of clear legislative or regulatory drivers, the Australian water industry has tended towards a voluntary and discretionary approach to addressing water industry operator training requirements, but with limited guidance as to what constitutes an appropriate level of technical competency.

The WaterRA - Technical Competency Benchmarking Project was intended to develop a recognised industry Technical Competency Benchmark and Auditing Tool to successfully deliver the training and skills needed for frontline water industry operations.

The intention of the Benchmark and Auditing Tool is for water utilities to facilitate identification of operator roles and responsibilities and undertake training and competency gap analyses. It can also facilitate regulator audits of drinking water and recycled water schemes, supporting auditing of training and competency aspects of application of regulations and guidelines.

The Technical Competency Benchmark and Audit Tool were completed in November 2023 and shared with the broader water industry in a Knowledge Sharing workshop.

1.2 Lessons from Experienced Operators

WaterRA identified a need for research into the workplace experiences and decision-making processes of water industry operators. This is an area of the Australian water industry that has received very little attention, despite a growing body of evidence indicating the impact of human factors on exacerbating water quality safety incidents (Wu et al 2009, Hrudey et al 2019).

The ‘Lessons from Experienced Operators’ project is particularly interested in the learning journey and the experience that contributes to some of the water industry’s most valued operator skills. These include troubleshooting, problem-solving, and critical thinking. It is these skills that underpin decision-making by water industry operators in the provision of safe drinking water and wastewater treatment. Experienced water industry operators use these skills to provide a vital contribution towards a water utility’s ability to meet its public health and environmental protection objectives.

2.0 DISCUSSION

2.1 The Technical Competency Benchmark and Audit Tool

The Technical Competency Benchmark for Water Industry Operators provides a set of benchmarking tables organised into Themes and Elements, and an associated Audit Tool.

The Benchmark has been written based on the specific tasks and responsibilities of water industry operators, and the technical, water quality and process-specific training needs to fulfil their roles.

Training and competency, *specific to water industry operator roles*, is guided by:

- Australian state & territory water industry regulations (e.g. safe drinking water regulations, wastewater public health & environmental regulations) and national water quality risk management guidelines, considering a whole of water cycle risk management approach.
- The Australian Water Occupation Framework (AWOF, 2014), hosted on the Water Industry Operators Association of Australia (WIOA) website, which defines water industry operator roles.
- Access to nationally recognised units of competency, skills sets and qualifications as set out in the National Water Training Package (NWP) or, where applicable, other relevant Vocational Education and Training (VET) training packages.

2.2 Structure of the Technical Competency Benchmark

The Benchmark is based upon two Guiding Principles:

1. For development and delivery of water industry operator training and competency programs, it is important to adopt a technical competency management planning cycle approach (See Figure 1).
2. The goal of the Benchmark is for water utilities to strive towards having appropriately trained and competent water industry operations staff on duty and on the job in all circumstances.



Figure 1: Guiding Principle 1 - A cycle of technical competency management.

A set of Benchmarking Tables has been developed to allow water utilities to self-assess technical competency programs, supported by an Audit Tool. The Benchmarking Tables are arranged into three **Themes** and associated *Elements*:

1. Technical competency systems and processes

- 1.1. Alignment of technical competency with Acts, Regulation, Guidelines
- 1.2. Alignment of technical competency with organisational goals and strategy
- 1.3. Integration of technical competency with HR systems and processes

2. Developing and maintaining technical competency

- 2.1. Definition of water industry operator roles and responsibilities
- 2.2. Minimum skills and knowledge requirements
- 2.3. Competency evaluation and training gap analysis
- 2.4. Site specific competency evaluation
- 2.5. Operator technical competency self-evaluation

3. Addressing specific training needs and challenges.

- 3.1. Process to evaluate and identify specific training needs.
- 3.2. Selecting and engaging RTOs and training providers
- 3.3. Managing training budgets
- 3.4. Technology and digital literacy

Entries in the Technical Competency Benchmarking Tables have been colour coded as follows:

Table 1: Colour coding for benchmarking tables and audit tool

Red	A Priority 1 Element - a high priority for implementation or should already have a system in place.
Orange	A Priority 2 Element – these are typically <i>supporting Elements</i> for those Elements identified as Priority 1.
Green	A Priority 3 Element – These Elements demonstrate good practice in technical competency.

Figure 2 is an example of one of the Elements in the Benchmarking Tables. Each Element in the Benchmarking Tables is arranged according to:

1. The number and title of the Element
2. The Rationale – which is a description/definition of what the Element is about.
3. Assessment Criteria – this describes what is being assessed, who is responsible (regulators, utilities), how frequently Elements should be assessed and for what.
4. Additional information – provides further guidance regarding implementation of the Element or refers to additional supporting resources.

Technical Competency Benchmark
Interpretation of the Benchmark tables

1.	2.	3.	4.
Element	Rationale	Assessment Criteria	Additional Information
2.1 Definition of water industry operator roles and responsibilities	The first step in developing technical competency is defining the water industry operator roles and responsibilities. There should be a role or position description which outlines: -Key Responsibilities. -Skills set. -Qualifications/accreditations. -Other relevant skills (e.g., drivers licence, first aid etc.).	Water utilities: Identification of all water industry operator roles across the organisation. Role or position descriptions for all water industry operator roles within the organisation. Frequency: review and update all water industry operator role/position descriptions at a minimum interval of every 3 years.	Good resources for development of operator role descriptions are: -The Australian Water Occupations Framework -The WaterNZ Competency Framework The role description does not need to be specific to a site or a person. It can be generic and outline the main tasks and activities of a role (e.g., water treatment operator). An operator role description should be written in such a way to make it possible to create a skills matrix for that role (See Element 2.2).

Figure 2: Structure of the Benchmarking Tables

2.3 The Structure of the Audit Tool

The Technical Competency Benchmark – Auditing Tool, is comprised of a list of questions:

- Which map across to the Themes and Elements, as set out in the Benchmarking Tables.
- That are intended to support the Assessment Criteria (what, when, who) for each of the Elements.

The questions in the Audit Tool are arranged according to Elements. The intention is the auditor provides a yes (Y) or No (N) response based on whether:

- There is a system or process implemented by the organisation, as described in the question.
- There is some form of evidence available to demonstrate that system or process is in place.

If the answer to both above points is Yes, then the response is ‘Y’. If the answer is No to one or both above points, the response is ‘N’.

As illustrated in Figure 3, for a yes (Y) response, provide the references to the:

1. Evidence in the column provided, with
2. option to provide more detail in the Remarks.

For a No (N) response, provide further information, clarification and possible next steps or recommendations in the Remarks column.

Auditing Tool
Interpreting the Tool

	Question	Y/N		Evidence (Document title, section, page #)	Remarks (e.g., Explain if different from Benchmark and why)
1.2	Alignment of technical competency with organisational goals and strategy				
	Documentation of the key skills and knowledge required by employees, relating to organisational priorities, strategic plans, and goals.	Y	N		
	Organisational training metrics set, data collected, and outcomes measured and reported, to facilitate evaluation and improvement of training and competency across the organisation.	Y	N		

Figure 3: Structure of the Audit Tool

2.4 Lessons from Experienced Operators

In the Lessons from Experienced Operators project a Decision Ladder (DL) Template provides a framework for understanding the decision-making process used by water industry operators in the workplace, when faced with a range of situations, both in routine and challenging non-routine events (See Figure 4).

The project aims to provide real world workplace examples and case studies, both from published literature and from a series of water industry operator interviews, to demonstrate the decision-making process of frontline operators in the context of the DL Template. In doing so, further evidence will be obtained to support and inform water industry regulators and utilities about frontline operator minimum competency standards and how to develop the high order critical decision-making skills.

Drawing on the case studies and interviews, guidance will be produced to facilitate water utilities adopting a more structured approach to water industry operator career planning and continuing professional development. This will be with the aim to build capability among operators in Situational Awareness, Skills/Rules/Knowledge-based Reasoning and Planning & Execution, in response to emergencies and incidents.

The Lessons from Experienced Operators project is ongoing and due to be completed in August 2024.

3.0 CONCLUSION

This paper presents on the outcomes of the WaterRA Technical Competency Benchmarking Project, which focused on development of a recognised industry Technical Competency Benchmark and Auditing Tool to successfully deliver the training and skills needed for frontline water industry operations.

The paper also outlines the extension to the project - Lessons from Experienced Operators. This project aims to provide real world workplace examples and case studies, from local and international literature, and from a selection of Australian water industry operator interviews. The intention is to demonstrate the decision-making process of frontline operators in the context of a DL Template.

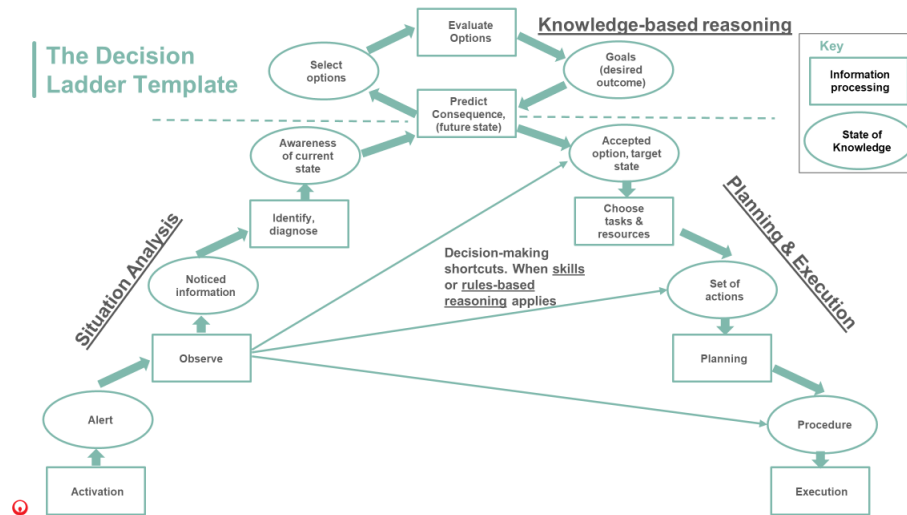


Figure 4: Example of a Decision Ladder template used to describe the operator decision-making process (Lilburne & Hassell 2019).

4.0 ACKNOWLEDGEMENTS

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5.0 REFERENCES

Australian Industry Standards (latest update Dec 2022) National Water Training Package (Release 5.0).

Government Skills Australia (2014) Australian Water Occupations Framework, 73pp.

Hrudey, S. E. & Hrudey, E. J. (2019) Common themes contributing to recent drinking water disease outbreaks in affluent nations. *Journal of Water Supply*, 19.6

Lilburne, C. M. & Hassell, M. E. (2019) Modifications to the Decision Ladder to match frontline workers' critical decision making. *Proceeding of the Human Factors and Ergonomics Society 2019 Annual Meeting*.

NHMRC, NRMCC (2011) Australian Drinking Water Guidelines Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council, National Resource Management Ministerial Council, Commonwealth of Australia, Canberra. 1223 pp.

NRMCC, EPHC, AHMC (2006) National Guidelines for Water Recycling: Managing Health and Environmental Risks, Natural Resource Management Ministerial Council, Environment Protection and Heritage Council, Australian Health Ministers' Conference, Canberra, 415 pp.

Wu, S., Hrudey, S., French, S., Bedford, T., Soane, E., & Pollard, S. (2009). A role for human reliability analysis (HRA) in preventing drinking water incidents and securing safe drinking water. *Water Research*, 43, 3227–3238.