

## Expression of Interest Funding Round 1 August 2010

### Goal 2: Establishment of a National Validation Framework for Water Recycling

#### Objective

This project seeks to help deliver a framework for the validation of individual treatment process barriers and preventative measures used in the production of recycled water as part of a multiple barrier approach to protect public health and the environment in Australia.

#### Definitions

**Water Recycling:** The beneficial use of reclaimed water for communities, industries and the environment.

**Validation:** Confirmation that the performance of a treatment process complies with the intent of the design.

**Process Barriers:** A treatment or process step used to reduce the concentration of a hazard.

**Preventative Measures:** Any planned action, activity or process that is used to prevent a hazard or reduce to an acceptable level.

**Multiple Barriers:** Use of more than one preventive measure as a barrier against hazards

#### Project Sponsor

This project is sponsored by the Australian Water Recycling Centre of Excellence (the Centre) under Goal 2 of its Strategic Research Plan (SRP).

#### Introduction

An important goal for the Centre is to work with industry, researchers and regulators to establish a National Validation Framework for use with water recycling schemes. The framework will support the validation of individual treatment processes for use in water recycling schemes. Achieving this goal will require the development of a rigorous framework that is acceptable to the agencies responsible for protecting public health in States and Territories. It also needs to be easily and consistently implemented by the proponents of water recycling schemes including private and public entities. The framework will have sufficient breadth to allow validation of existing and future technologies and packaging of technologies for the purpose of water recycling for each specific end use, from small-scale decentralized (e.g. in-house grey water recycling for lawn irrigation) to large centralized schemes (e.g. potable reuse).

## Scope

At present there is no National Validation Framework available to either the regulatory community or the proponents of water recycling schemes. The development of the Australian Guidelines for Water Recycling (AGWR) (2006) was a significant milestone in the advancement of water recycling on both the national and international stage. The AGWR provide a rationale for the development of health based targets for water recycling schemes. These targets are used to define the “performance targets” that must be achieved by the treatment process and preventative measures. This approach shifts the focus from end point monitoring which in the case of pathogens is expensive and does not identify any problems with water quality until potentially well after the public have been exposed to the water. In contrast, performance targets allow for timely intervention during the treatment process and reduce the need for end point monitoring. Implementation of the AGWR requires that the performance targets of the process barriers and preventative measures be validated prior to operation of the water recycling scheme. The development of a National Validation Framework will require resolving a range of issues, or “knowledge gaps”. Identifying these “gaps”, resolving them through research and developing a national consensus is a formidable task. To aid this, the following scope has been developed to compartmentalise the main issues that must be addressed in order to develop a validation framework.

The issues that must be addressed are divided into the following **Categories**:

1. Context of Validation;
2. Acceptance, Implementation and Revision;
3. Validation Logistics;
4. Impact Assessment.

The issues that are to be addressed in **Category 1** are associated with defining a scope that meets the requirements of the stakeholders and provides context for the roadmap based on Australian and international experiences with validating water recycling schemes. Specific issues include:

- An assessment of international approaches to validation or accreditation of the recycling schemes and individual treatment processes. Identification of how such a scheme could be developed within Australia.
- An assessment of accreditation or certification programs in existence within other Australian industries e.g. Standards Australia, construction and safety industries.
- The context in which the validation framework could be applied in each jurisdiction based on an understanding of how recycled water is regulated in each state and how the AGWR (Phase 1 and Phase 2) are used in the regulatory framework. Specific issues include how individual jurisdictions choose to modify the guidelines for large schemes, small schemes, on-site or package schemes, grey water applications and stormwater harvesting for potable reuse.
- An assessment of how a validation framework could be applied to schemes that existed before the development of the AGWR.

The issues that need to be addressed in **Category 2** cover how the roadmap to a National Validation Framework will be communicated, discussed, endorsed and implemented on a national level. This includes:

- What organisations need to be engaged to endorse and promote the national framework for validation.
- Which organisation is best positioned to help utilities navigate the validation process.
- Which organisation or national body (if any) should be responsible for independently assessing and accrediting treatment barriers for recycled water under a national validation framework.
- The need to establish a national repository to store performance data for individual process barriers and overall scheme performance.
- How will data be reviewed and added to a national data base.
- Where the national data base should be housed and ongoing responsibility for its maintenance.
- Access rights.
- Mechanisms for review or modification the national validation framework in the future.

The issues that are to be addressed in **Category 3** are associated with the implementation of the validation process. Specific issues include but are not limited to:

- An assessment of the existing data on the performance of various engineered technologies (separation, oxidation and irradiation) that are typically used as treatment barriers in water recycling schemes.
- An assessment of the existing data on the performance of various natural systems (wetlands, lagoons, aquifers) that may be used as barriers in water recycling schemes.
- What approach should be used to establish the conditions for testing individual process barriers (i.e. equipment age and presence of defects, loading rates and doses, water quality).
- Procedures for establishing log removal credits for preventative measures, such as impoundments, storage and controlled access.
- The occurrence of synergistic and antagonistic impacts on log removal between sequential process barriers in a water recycling scheme.
- Monitoring systems that should be used to establish critical control points and techniques for developing algorithms relating critical control point to log removal credits.
- The frequency for retesting/re-validation based on effects of equipment age and predictability of mean-time-to-failure.
- Protocols for preparing and submitting test reports, requirements for independent review and on-going record keeping.
- Appropriate microbial and chemical surrogates for monitoring performance of treatment technologies.
- Minimum statistical requirements for data collection and analysis.
- Laboratory accreditation requirements for surrogate testing and assessment.

The issues to be included in **Category 4** are associated with understanding the impact of the validation process in the context of a triple bottom line analysis. Specifically:

- How do smaller utilities navigate the validation process and how can a national framework accommodate utilities with limited institutional capacity.
- How can water authorities demonstrate or measure improvements in public health outcomes as a result of implementing additional process barriers or preventative measures in water recycling schemes.
- What is the cost and carbon footprint of each log reduction value for different water recycling schemes.

## Methodology

The Centre is calling for Expressions of Interest (Eoi) for a 2-stage project:

### Stage 1: Project Roadmap

- Completion of the knowledge/technology gap analysis for validation of water recycling schemes in Australia.
- Identification of critical expertise (academics, research centres, technology providers) that will be required to develop, communicate, endorse, implement and manage the National Validation Framework.
- Proposed timing and budget per specific sub-project (or work package).

### Stage 2: Establishment of National Validation Framework

- Project broken down in research sub-projects to address the different needs or scientific/technological gaps with delocalized management.

Upon review of the Eoi's, selected applicants will be invited to submit a full proposal.

The successful applicant will contract with the Centre for Stage 1 of the project with commitment to proceed with Stage 2 of the project. This commitment should include anticipated collaborating organisations and partners, and an outline of the strategic approach to achieving the Stage 2 outcomes (including but not limited to specific subprojects timelines and budgets, methodologies and stakeholders engagement).

## Project Partners

The Roadmap will be delivered by a multidisciplinary research team that could include representatives from the following organisations.

- Research Organisations
- State Health Departments
- Water Utilities
- Equipment Manufacturers
- Consultants
- Contract Operations Companies
- Design and Construction Companies

One individual organisation will serve as the project lead, with overall responsibility to coordinate the project and to help to deliver a National Validation Framework. The project team leader will ensure that all stakeholders have input into the Framework and that there is broad consensus among the stakeholders on the project. To this end it is critical that team leader consults and works closely with the National Recycled Water Regulators Forum.

### National Water Commission

The Centre is aware that the National Water Commission (NWC) is embarking on a project to improve urban water quality regulation in Australia. Following discussions with the NWC, it is likely that the Centre and NWC projects can and should complement each other. The successful applicants for this project will therefore be expected to liaise with the NWC and their regulatory reform project team during development of the validation roadmap, and seek to align project outcomes.

## Schedule

**Stage 1** (Project Roadmap) should take no longer than 6 months to complete after the project agreement is signed.

**Stage 2** of the project will be initiated upon acceptance by the Centre of the proposed Roadmap, including proposed budget and timelines according to specific sub-projects.

## Budget

The Centre will contribute up to AU\$ 200,000 ex GST for Stage 1 of the project. Further, the Centre considers that Stage 2 will be a very significant undertaking and is prepared to invest accordingly. As a guide to applicants and subject to confirmation once the Roadmap developed in Stage 1 has been accepted, the Centre has provisionally allocated up to AU\$ 3million for this second Stage.

Final project scope and funding approval will be subject to a recommendation by the Centre's Research Advisory Committee and approval by its Board.

Applicants must comply with the Centre funding principles, including cash and in-kind leverage and justification for expenditures.

## Project Advisory Committee

A Project Advisory Committee will provide guidance, review all reports and generally monitor performance on behalf of the Centre and the stakeholders.