

NatVal 2.2 – Sub-project 4 Validation Protocols (Integrated Testing Strategy) for a Multi-Barrier Approach in Water Recycling



Lead organisation

The University of New South Wales (UNSW)
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Sub-project Leader

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Sub-project summary

Validation approaches for recycled water schemes tend to consider each process one step at a time and do not sufficiently integrate between process steps to quantify the benefits of synergies and multiple barrier reliability. As a result, multiple conservative assumptions are often compounded, leading to a requirement for additional treatment steps and adding cost to recycled water schemes. The purpose of the research is to build on previous work undertaken on chemical and microbial reduction to validate the multi-barrier approach using whole-of-process-train reliability engineering.

Key aims and objectives:

- review available risk assessment methods for implementation in the validation of water recycling processes and projects.
- collate and analyse pathogen monitoring data in order to provide the starting pathogen concentration for Australian sewage recycling schemes (those used for the 2006 guidance are known to be out-dated and overly simplistic).

- provide recommendations for the collection and incorporation of suitable chemical, microbial, or surrogate data in performance assessment/validation activities. This will specifically address factors such as the appropriate duration of validation testing.
- identify key characteristics of a framework to apply to the validation of water recycling unit processes to ensure consistency of data collection, statistical evaluation, and performance assessment.
- develop a rigorous basis for the incorporation of potential hazardous events (i.e. non-ideal operational conditions) and performance failures in the validation process.
- provide case studies of appropriate risk assessment methods for the validation of a specific water recycling process.
- provide recommendation of practical approaches for combining the individual validation of unit processes to achieve the overall validation of multi-barrier water recycling projects.

Participants

University of New South Wales (UNSW)
WaterFutures (WF)
Griffith University (GU)
National Measurements Institute (NMI)
SA Water (SAW)
Melbourne Water (MW)
WA Water Corporation (WC)
SouthEast Water (SEW)

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Budget

Salaries	Operating costs	In-kind contribution	Total value
\$ 266,112	\$ 108,600	\$ 357,588	\$ 732,300

Milestones

- 31 January 2014** Literature review and initial draft of validation protocol
- 31 July 2014**
 - 1) Detailed report on desktop case study and detailed plan for the two experimental case studies.
 - 2) Summaries of pathogen concentrations, including the frequency distributions, for common recycled source water categories.
- 31 March 2015** Final report on case studies and final validation protocol
- 30 June 2015** Final report



Work program

