Implications for Operator Certification and Training
Sure, the technology works,

"Eighty per cent of the failures he recorded were not due to failures of technology ... but were due to human error"

Professor Don Bursill, the CEO of the Cooperative Research Centre for Water Quality and Treatment, Australia 2007 (The Age June 5, 2007).
Operations - Striking the Right Balance

OPERATING PERFORMANCE

- Public Health
- Quality
- Production

OPERATING COST

- Operator Effort
- Chemicals and Energy
- Asset Replacement
Operations – the Linchpin for Success

Linchpin (n) something [or someone] that holds the various elements of a complicated structure together

Successful Operations Requires

• Infrastructure Designed correctly and thoroughly tested.
• Operation must be realistic and practical.
• Assets and Infrastructure Maintained and Highly Reliable.
Holding the Various Elements Together...

Operations Management

- Roles and Responsibilities
- Operational Monitoring
  - Water Quality Sampling and Analysis
  - On Line Quality Monitoring
- Non Conformances Corrective/Preventative Actions
  - Critical Control Point Response Procedures
- Managing Incidents and Emergencies
  - Emergency Response Procedures
  - Emergency Response Communication
- Operating Interface Protocols
  - Upstream Wastewater Interface Protocol
  - Downstream Water Interface Protocol
- Operating Procedures
  - Critical Control Point Response Procedures
  - Process operating procedures
- Asset Management and Maintenance
  - Maintenance Management
  - Asset Condition and Risk Assessment
- Operator Skills and Training
  - Training Requirements
  - Certification
- Validation and Auditing
  - Specific process equipment maintenance (e.g. membrane management)
Operations – Managing for most of plant life.

Good design critical.

Handover a risk area.

Most of the project success hinges on performance after handover.
DPR Requires Many Non “Traditional” Technologies

Technologies that are new to many operators.

More akin to water factory than water treatment plant
Where to I Find Trained Reuse Operators?

A gap in training and certification for reuse.

Where do we find experienced operators?..

Can we afford to/are willing to pay for them?
But It’s Fully Automated!

**Weekly Alarm Count**

**Alarms per Day (Weekly Avg)**

- **Plant 1**
- **Plant 2**

![Weekly Alarm Count Chart](image)

IPR Plant Weekly Alarm Log
High Demands on Water Analysis

Little margin for error.

100% compliance expected.

Sampling techniques.

Training external laboratories.

High costs
We Don’t Control the Whole Process

• Upstream wastewater treatment plants have other treatment goals.

• Good operating interfaces are critical – but can be challenging.
How successful to we need to be.

- Is this 8 failures or 99.98% success?

8 non-conformances out of 39675 tests (0.02%).

(All minor non acute).

Bundamba AWTP – Western Corridor - Australia
Navigating the Regulations

- Regulatory reporting falls to operations.
- Good systems must be in place early.
- Reporting accurate and timely.
- Open dialog
Have We Got Our Staffing Numbers Right?

- Does it match regulatory requirements.
- Are all the tasks and maintenance covered?
- Do we have enough trained folks?
What about when something goes wrong?

• Emergency response/corrective actions.

Emergency Response Plans

Non conformance actions.

Communication (Messaging)
• Things wear out.
• Equipment fails.

When to replace?
What spares to keep?
How often to maintain?
Reliability of controls.
WRRF-13-13:

Can We Trust Operations?

Development of Operation and Maintenance Plan and Training and Certification Framework for Direct Potable Reuse (DPR) Systems
Phase 1: Develop a Standard Operations and Maintenance Plan for DPR Schemes

- Operating Protocols/Framework
- Regulatory Framework
- Operator Certification Program

California Focused
WRRF 13-03
Critical Control Point Assessment to Quantify Robustness and Reliability of Multiple Treatment Barriers of a DPR Scheme

WRRF 13-13
Development of Operation and Maintenance Plan and Training and Certification Framework for Direct Potable Reuse (DPR) Systems

Operational Framework
Implications for Operations Certification and Training
CA Regulations and DPR?

CCR Title 17, Division 1, Chapter 5, Group 4
Cross Connection/Backflow Connection

CCR Title 22, Division 4, Chapter 3
Water Recycling Criteria (IPR Orange County GWRS)

Groundwater Recharge

Surface Water (pending)

DPR ?
Evaluation of the California Code of Regulations and Recommendations

Gap analysis of existing regulations and recommendations

Gap Analysis is Under way

Title 22, Article 5, Section 60314

The methods of operation of a dual plumbed recycled water system shall be described to assure avoidance of cross-connections between the recycled water and potable water piping systems.

Who should the permitting authority be?
Phase 2: Develop a DPR Training and Certification Curriculum Framework for DPR System Operators
Recommend DPR System Staffing

- Benchmark Staffing from IPR Utilities
- Include anticipated regulatory requirements
- Incorporate HACCP Requirements
How Does Operator Certification Fit?

Certification for drinking water, wastewater and distribution.

Where should DPR fit?

- Wastewater
- Water Reuse
- Drinking Water
- Distribution
Develop Recommended Operator Staff Training and Certification Framework

- Based on gap analysis previously conducted.
- Technology and important operational systems/processes.
- Training co-ordination experience.
Can We Trust the Technology?

Trust but Verify

YES

13-03
Technical Validation

Can We Trust Operations?

YES

13-13
Operational Validation