2004 AUSTRALIAN DRINKING WATER GUIDELINES

David Cunliffe

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Revision Process

- Commenced in 1998 (pre Sydney Incident)
- Commenced with priority setting group (Jan 1998).
- Established Coordinating Group
  - Don Bursill *Chair*
  - David Cunliffe *NHMRC*
  - Peter Scott *NRMMC*
  - Anne Neller enHealth
  - Alec Percival CHF
  - John Langford WSAA
  - Brian McRae AWA
  - Phil Callan NHMRC
- Annual call for submissions of items for review

Working Groups

- Microbial
- Risk Management
- Pesticides
- Protozoa
- Radiological
- Water Treatment Chemicals

Outputs (1)

- Framework for Management of Drinking Water Quality
- Addition of Guiding Principles
- Revised Chapter on Radiological Quality
- New Chapter 8 Drinking Water Treatment Chemicals
- New Fact Sheets on:

Coliforms	*Escherichia coli*
Burkholderia	*Cryptosporidium*
Giardia	*Microcystins*
Nodularin	*Saxitoxins*
Cylindrospermopsin	*Radium, Beta and Gamma emitters*
Aluminium	*Boron*
Copper	*Monochloramine*

Outputs (2)

- In 2003 a reorganisation of the Guidelines coupled with addition of *Guiding Principles* and the *Framework*
- Summary of the 1996 ADWG was rescinded
- Glossary
- *Review of coliforms: As microbial indicators of drinking water quality*
- *Water made clear: A consumer guide to the Australian Drinking Water Guidelines 2004*

Guiding Principles 1–3

- The greatest risks to consumers of drinking water are pathogenic microorganisms. Protection of water sources and treatment are of paramount importance and must never be compromised
- The drinking water system must have and continuously maintain robust multiple barriers appropriate to the level of potential contamination
- Any sudden or extreme change in water quality, flow or environmental conditions (eg extreme rainfall or flooding) should arouse suspicion that drinking water might become contaminated

Guiding Principles 4-6

- System operators must be able to respond quickly and effectively to adverse monitoring signals
- System operators must maintain a personal sense of responsibility and dedication to providing consumers with safe water: and should never ignore a consumer complaint about water quality
- Ensuring drinking water safety and quality requires the application of a considered risk management approach

The Framework –Background

- By far the most important addition to the ADWG.
- Concern that were as an over-reliance on a number driven approach to management. Operating and health decisions were being based on compliance testing (0 *E.coli* meant the water was safe).
- Lack of a coordinated approach involving all appropriate agencies (water suppliers, health, catchment managers, planners etc)
- Disparity in standards/attention applied to rural and remote communities compared to capital cities
- Problems highlighted by the 1998 Sydney Water Incident and the 2000 Walkerton Outbreak

Sydney 1998

- ***The problem:***
  "Contamination: water crisis grips Sydney", "Safe water: the big lie", "Zoo's water was better than ours" "Do panic! There's a bug in the water"
- ***Communication:***
  "Restricted warning a blunder" "Sydney Water Chairman threatened to sack health spokeswoman" "Verbal battle with health officials"
- ***The cause:***
  "$3bn treatment plants fail to target disease" "Dead dogs" "Drips running Sydney Water" "Bat droppings" "Lack of catchment care"
- ***The solution:***
  "Sydney water will now be tested to the highest degree of safety in the world" "Remedy may cost $300M"
- ***The human element:***
  "Broken public trust will take years to repair" "Nobody dead yet: Minister pleased" "Chief resigns" "Chairman resigns"

Walkerton 2000

- ***The problem:***
  Contamination of a groundwater supply with animal manure containing E.coli 0157 and Campylobacter

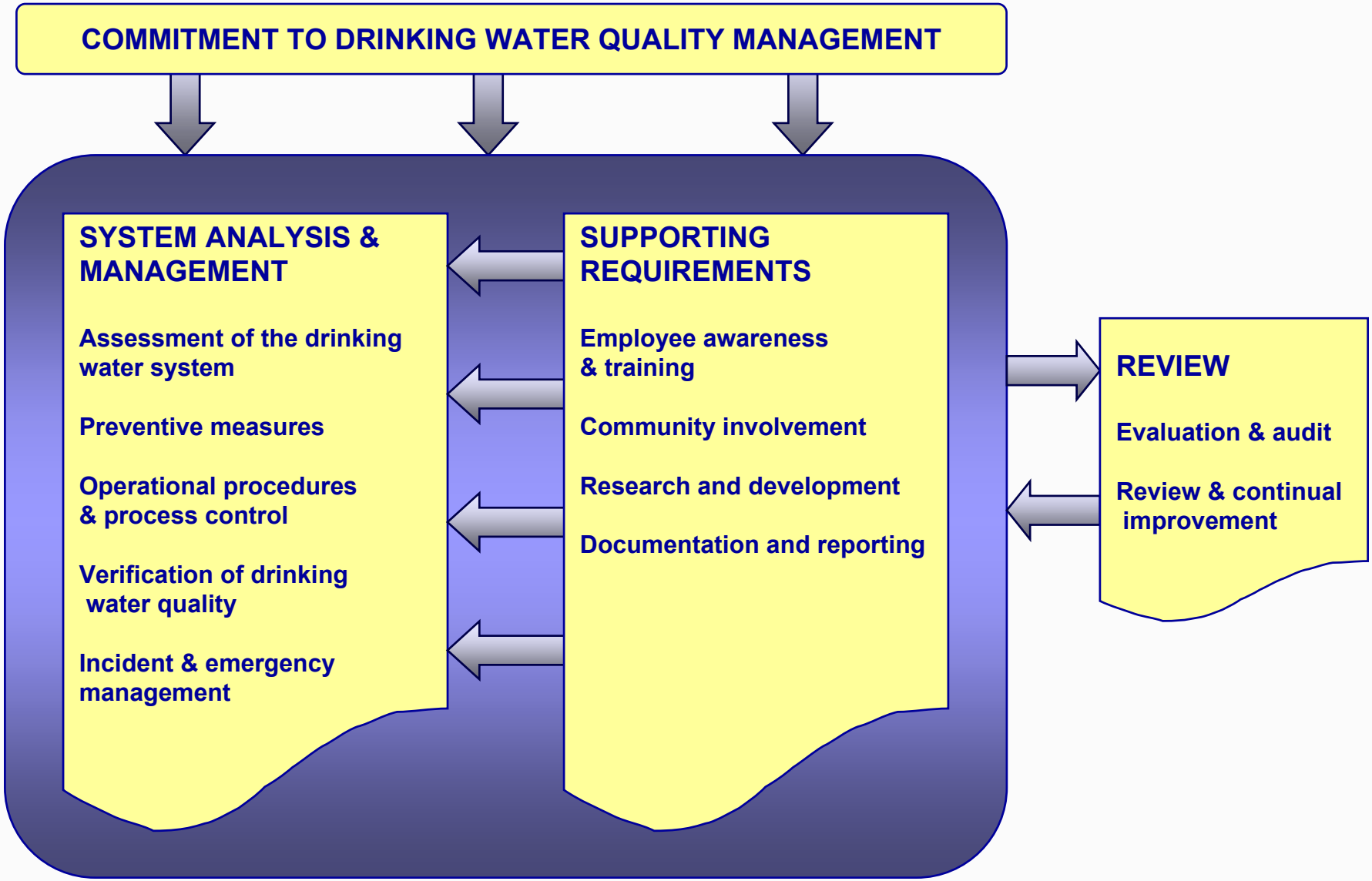
- ***The system***
  Catalogue of errors. Very poorly run. Management and oversight lacking. Chlorination of vital bore not operational.

- ***The human element:***
  Devastating. Over 2000 illnesses and 7 deaths. Long lasting impacts on the community. Broken public trust. Operators prosecuted.

The Framework –Principles

- The *Framework* is consistent with existing risk management systems including HACCP and ISO standards.
- Like the WHO *Water Safety Plan* approach it is purpose designed system to meet the particular requirements related to supplying drinking water
- It can be implemented in a flexible manner – can start with HACCP, ISO or directly from the ADWG. Can chose which elements apply

Framework


COMMITMENT TO DRINKING WATER QUALITY MANAGEMENT
SYSTEM ANALYSIS & MANAGEMENT
Assessment of the drinking water system
Preventive measures
Operational procedures & process control
Verification of drinking water quality
Incident & emergency management
SUPPORTING REQUIREMENTS
Employee awareness & training
Community involvement
Research and development
Documentation and reporting
REVIEW
Evaluation & audit
Review & continual improvement

Framework Advantages (1)

- A preventive risk management system that provides a measurable assurance that safe drinking water is provided 24 hours a day.
- Identification of hazards that represent significant risks and appropriate control measures and critical control points. Cost effective.
- Identification of operational monitoring requirements and operating limits (particularly critical limits for CCPs)

Framework Advantages (2)

- Monitoring that, wherever possible, detects faults prior to supply to enable corrective actions to be implemented before unsafe water reaches consumers
- Improved communication, better preplanning for incidents and more measured responses when needed
- Fewer surprises/unexpected disasters
- A system that can be verified (compliance monitoring) and audited

Application of the Framework

- Strong support from water suppliers and health agencies
- Major cities have implemented risk management systems (some started with ISO or HACCP accreditation).
- Implementation commenced in other urban centres and for smaller supplies. However smaller supplies need assistance

Rural and Remote Supplies

- An Australian survey of over 2000 rural and remote supplies found that inadequate management represented the largest threat to drinking water quality
- Internationally similar concerns have been identified with management of small systems. Often these systems are operated by personnel with limited expertise and resources
- WHO and others have recognised the need for additional guidance for these systems. International meeting in Iceland in Jan 2005, 2nd meeting in Alice Springs in July.

NHMRC Rural and Remote Water Quality Project

- NHMRC is supporting development of an electronic tool to facilitate improved management of drinking water quality in rural and remote communities including Indigenous communities

- The tool will produce
  - customised management plans from basic information provided by system operators
  - an assessment of whether systems are likely to provide safe drinking water

- Plans produced are consistent with the Framework for Management of Drinking Water Quality

Inputs

(Framework element 2)

- **Structure of the system including:**
  - **Catchment (groundwater/lake/river etc) and potential impacts (agriculture/human/mining)**
  - **Reservoirs/dams**
  - **Treatment**
  - **Service reservoirs/storage tanks**
  - **Distribution system**
- **Water availability and restrictions**
- **Population size**

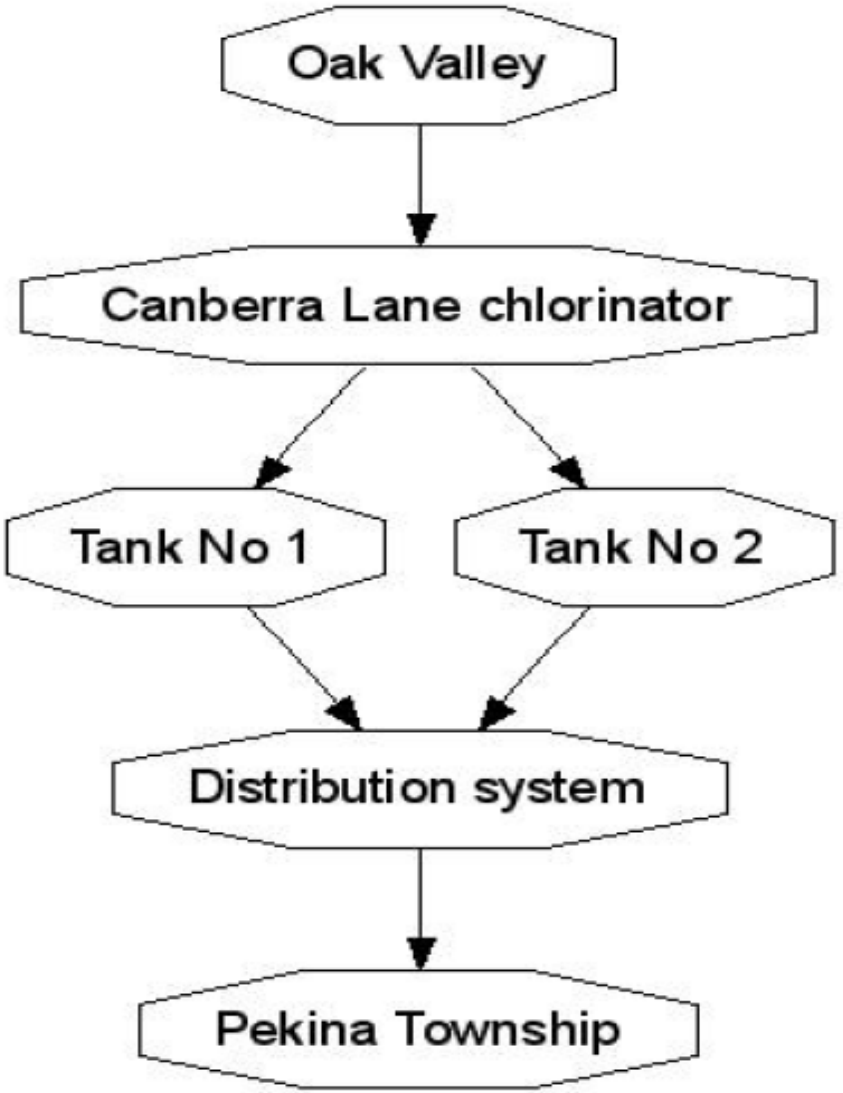
Outputs

- **Risk management plan listing:**
  - **hazards, risks and preventive measures**
  - **operational monitoring, target criteria and corrective actions**
  - **verification (compliance) monitoring**

- **Schematic of the system**

- **Assessments of:**
  - **water availability**
  - **whether the system should supply safe water (subject to good management)**

Schematic – Pekina Station



Risks and Prevention

Hazards and Risks : Oak Valley Bores

- **Hazard**

  If protection against livestock or human activity fails, potential for harmful microorganisms or chemicals to enter the water body.

- **Risk**

  Illness from ingestion of harmful microorganisms
  Health or aesthetic impact of chemicals.

Preventive Measures

- **Protect the borefield from contamination by livestock and people, eg:**

  - **establish a minimum protection zone (eg 50 m) around bores**
  - **access denied**
  - **secure fencing locked gates**
  - **limits on agriculture**
  - **contour banks to reduce erosion**

Operational Monitoring

Weekly Monitoring: Canberra Lane Chlorinator	*Targets*	*Corrective action*
• Monitor free chlorine residuals in distribution system.	• Chlorine residual ≥ 0.2 mg/L at set monitoring locations within distribution system. • Chlorine residual does not exceed 5 mg/L (lower limits could be required to limit taste and odour complaints).	• Flush distribution system to remove unchlorinated or overchlorinated water. • Check raw water quality for evidence of major changes (eg colour and turbidity), and adjust chlorine dose as necessary.

Verification

Weekly : Distribution System

- **Test for *E.coli***
- **Monitor and review public complaints**

Responses

- **If *E coli* detected, investigate potential sources, institute remedial action and collect further samples. If *E coli* are detected in repeat samples increase disinfectant doses and expand investigations**
- **Public complaints about odour or change in appearance of water may be caused by faults in distribution systems.**

Summary

- A great deal of change has occurred since the 1996 guidelines were published
- The change culminated in the reorganization of the guidelines to incorporate the Framework for Management of Drinking Water Quality and production of the 2004 edition.
- The 1996 guidelines were based on the WHO Guidelines for Drinking-water Quality. The link between the ADWG and the WHO Guidelines has been strengthened:
  - 2001 meeting with WHO in Adelaide focussing on development of risk management plans
  - several Australians contributed to the development of the 2004 WHO Guidelines for Drinking-water Quality
  - in July 2005 an NHMRC/WHO Meeting will be held to discuss development of risk management plans for small communities

2004 Guidelines

www7.health.gov.au/nhmrc/publications/synopses/eh19syn.htm