

Australian Drinking Water Guidelines: Draft framework on microbial health based targets

November 2016



CENTRAL NSW
COUNCILS



Centroc's Mission is to be recognised as the lead organisation advocating on agreed regional positions and priorities for Central NSW whilst providing a forum for facilitating regional co-operation and sharing of knowledge, expertise and resources; effectively nurturing sustainable investment and infrastructure development.

www.centroc.com.au

4 November 2016

Reference bw:vp 111604
Enquiries: Ms J Bennett: 0428 690 935

Water Project Officer
Environmental Health and CAM Section
NHMRC
GPO Box 1421
Canberra ACT 2601

To whom it may concern,

Re: Australian Drinking Water Guidelines: Draft framework on microbial health based targets

Central NSW Councils (Centroc) represents over 243,000 people covering an area of more than 72,500sq kms comprising the Local Government Areas of Bathurst, Blayney, Cabonne, Cowra, Forbes, Hilltops, Lachlan, Lithgow, Mid-Western, Oberon, Orange, Parkes, Upper Lachlan, Weddin, and Central Tablelands Water.

It is about the same size as Tasmania with half the population and a similar GDP.

Centroc's vision is to be recognised as vital to the sustainable future of NSW and Australia.

Its mission is to be recognised as the lead organisation advocating on agreed regional positions and priorities for Central NSW whilst providing a forum for facilitating regional cooperation and sharing of knowledge, expertise and resources.

Centroc has two core objectives:

1. Regional Sustainability - Encourage and nurture suitable investment and infrastructure development throughout the region and support members in their action to seek from Governments financial assistance, legislative and/or policy changes and additional resources required by the Region.
2. Regional Cooperation and Resource Sharing – Contribute to measurable improvement in the operational efficiency and effectiveness of Member Councils through facilitation of the sharing of knowledge, expertise and resources and, where appropriate, the aggregation of demand and buying power.

The Centroc Board is made up of the 30 Mayors and General Managers of its member Councils who determine priority for the region. These priorities are then progressed via sponsoring Councils. For



Centroc was selected as one of five regional pilot Joint Organisations to assist the NSW Government strengthen and reform local government.

more advice on Centroc programming and priorities, please go to our website

<http://www.centroc.com.au>

Centroc has a proud track record in devising and delivering innovative cutting-edge regional programming. It succeeds through the good will and industry of its members and staff working collaboratively to the benefit of the region and its communities.

Centroc Water Utilities Alliance

In NSW, Local Government owned water utilities provide water and sewerage services, delivering public health outcomes for regional NSW.

Local Government management of water utilities in Central NSW including the delivery of quality drinking water is being undertaken on a solid basis through the Centroc Water Utilities Alliance (CWUA)

Formed in 2010, the Centroc Water Utilities Alliance aims for Local Government to be recognised as national leaders in delivering secure and quality water supplies and sewerage services to grow Central NSW to 2059 and beyond.

The CWUA's strategic approach delivers effective and efficient services through:

- Regional strategic planning and prioritisation
- Inter-governmental collaboration
- Regional leadership and advocacy
- Operational support to member Councils.

Recognised by the Productivity Commission, CWUA achievements include:

- Collectively saved members in excess of \$600k
- Attracted over \$3m in grant funding for programming
- 100% Compliance in Best Practice management plans
- Completed regional Integrated Water Cycle, Drought, Demand Management and Strategic Business Plans
- A Regional Priority Water Infrastructure Plan to inform investment
- A Training and Mentoring Workforce Resource Sharing Plan
- Compliance based training in drinking water quality to over 70 water operators
- Formation of a Centroc Operators Group for training, mentoring and skills development of Water and Waste Water Treatment Operators meeting quarterly.
- \$40k in Skill Set funding for a pilot Workforce Development Program aimed at certification of water treatment operators under the National Certification Framework at 4 member

Councils resulting in 14 Water Operators achieving qualifications required to meet Certification with further roll-out underway.

Drinking Water Management Systems

The supply of quality drinking water to Central NSW communities is of the highest priority for Centroc member Councils who are supported in achieving this through the CWUA with the following:

- A Drinking Water Quality Working Party acts in an advisory capacity monitoring progress to achieving regional compliance with the Public Health Act and Australian Drinking Water Guidelines (ADWG).
- Implementation of a process for monitoring and reporting progress on Drinking Water Management Systems Plan implementation and co-ordinating regional response to issues.
- Training procured on a regional basis through accredited industry specialists on Water Sampling and the ADWG for Water Operators and Managers to ensure best practice and compliance based delivery of safe, quality drinking water.
- Implementation of a bi-monthly process for communication by NSW Health at a regional level on issues regarding compliance and other State managed programming relating to drinking water quality.
- In keeping with the principles of the CWUA to encourage capacity building through shared learning, Drinking Water Management is a regular agenda item at bi-monthly CWUA meetings where members are encouraged to share advice on specific water quality issues, technologies implemented to improve water quality and tools such as templates or protocols developed for water quality management.

Projects currently underway:

- A one-off project to analyse regional drinking water quality data to benchmark the performance of CWUA member Councils in drinking water quality management across the region and against relevant benchmarks for a period of five years. This project will inform an annual Regional Drinking Water Management Work Plan identifying and prioritising activities aimed at achieving best practice in drinking water management.
- Applying a strategic risk based approach, a suitably qualified consultant is being procured to facilitate a workshop with CWUA LWUs and NSW Health representatives to develop a shared understanding and alignment of communication in the compliance framework. Specific considerations are incident management and boil water alerts. Advice from this will inform tools and protocols to facilitate a more effective and efficient collaboration between NSW Health and Centroc members LWUs in the Central NSW region.

In the context of Local Government reform in NSW, the CWUA demonstrates the efficiencies of co-operative partnerships in delivering the National Water Initiative strategic agenda. Programming is innovative and focused on compliance based best practice service delivery to achieve optimal outcomes for communities.

COMMENTS ON THE DRAFT FRAMEWORK ON MICROBIAL HEALTH BASED TARGETS

1. Background

The National Health and Medical Research Council (NHMRC), authors of the *Australian Drinking Water Guidelines* are proposing the inclusion of microbial health based targets (HBTs) with draft wording outlined in the *Draft Framework on microbial health based targets* (draft HBT framework).

The draft HBT framework lays out several options for water utilities to meet the HBTs.

For smaller utilities this could involve using default treatment processes based on categorising the type of water source. For more technically advanced utilities a more system-specific approach using water supply-specific monitoring data (where this exists) can be used. For utilities that do not meet the existing standards in the ADWG, the HBT framework describes a water safety continuum, where the utility can plan improvements to its operation in order to work towards the goal of safer water and best practice.

The NHRMC is seeking public comment on the draft HBT framework. Centroc's views are summarised in this document.

1.1 Overview

The Centroc Water Utilities Alliance (CWUA) welcomes the opportunity to make a submission. As detailed above, the delivery of safe, quality drinking water to the communities of Central NSW is of the highest priority for the CWUA with Centroc councils steadily working towards improvements in Drinking Water Quality Management through implementation of a program of regional initiatives.

Centroc support the approach of the HBTs and improved water quality and lower health risks for all Australian potable water systems. However, capital and operational cost implications and the practicalities of implementing the new approach need to be closely considered.

The CWUA membership supports overarching comments made in the submission by the NSW Water Directorate that the evidence on which the *Draft Framework on microbial health based targets* is based is currently insufficient to justify the potentially enormous infrastructure investment that would be required to meet the Framework.

Specific concerns raised by the Water Directorate and supported by the CWUA are that:

- Typical catchments for western NSW were not well considered in the Deere et al (2014) paper on which the bin or category classification is based;
- No credits are given for environmental land and water inactivation of pathogen infectivity;
- There is little recognition of the proximity of the activity relative to the source water offtake, particularly for run of river systems.

Centroc have a number of additional concerns on the implications of the draft HBT framework being implemented. These include the investment required to comply with the framework, the amount of monitoring and data collection required, the discrepancy between catchment categorisation based

on sanitary survey versus faecal indicators, and the insufficient data available at this time to provide a complete HBT approach.

Representing 14 Local Government Local Water Utilities in regional NSW with a range of water supply systems, Centroc would also be very happy to participate in pilot projects to investigate the issues HBT implementation may bring.

2 Issues

2.1 Investment Requirements

2.1.1 Draft HBT Framework Position

The requirements as laid out in the draft HBT framework are expected to require significant capital investment in new infrastructure and improvements to existing facilities, as well as ongoing operational costs.

Additional evidence needs to be provided to support the health benefits suggested, and in comparison with other health issues in regional communities. There is largely more community support for improving access to medical facilities, suicide prevention and drug addiction. Money spent in these areas may give a better microDALY risk reduction return.

2.1.2 Centroc

In order to achieve the HBTs each water supply system is likely to require multiple capital and operational improvements as indicated in the WRA/WSAA publication “Good Practice Guide to the Operation of Drinking Water Supply Systems for the Management of Microbial Risk Research Project 1074” possibly including:

- additional flow meters, control valves and pump VSDs to extend and smooth WTP operation. This also likely to require additional operational staffing;
- additional online monitoring and control possibly requiring PLC and software upgrades;
- improved coagulation and pH system control and operation;
- potential additional polymer dosing to improve clarifier performance in addition to optimised operation of clarifiers;
- in many cases filter media replacement and improved filter operation and monitoring with automated backwashing systems included;
- wastewater system management and improved recycling control and sludge management;
- improved disinfection systems and monitoring;
- additional UV disinfection systems in most cases;
- priority alarm systems with automatic shutdowns and operator call outs; and
- operator training and higher levels of operator attendance.

While all of these improvements are beneficial and Centroc supports their implementation in order to reduce consumer health risk, the additional capital and operating cost associated with this is likely to run into millions of dollars for each water supply system. Centroc has more than 30 water supply systems between its member water authorities. The funding required will easily run into the tens of

millions of dollars for Centroc councils and consideration will need to be given to where this funding is likely to be sourced from.

It is recommended that funding sources for implementation are considered together with water quality / technical issues, and suggest that the State Government collaborate with Centroc in delivering a practical change process.

How will state and possibly federal governments manage the additional funding that will be required? In NSW, the NSW Country Towns program ceased further funding applications a long time ago. We understand that Infrastructure NSW is planning on distributing funds for various water projects in the future but the process of applying for funding needs to be made clear. Local Government is unlikely to be able to provide such levels of funding on its own.

2.2 Data Collection and Monitoring

While Centroc councils are steadily working towards improvements in Drinking Water Quality Management including data collection and monitoring, currently few would have the level of data required to be able to best evaluate their own catchments and treatment ability.

Section 5.7.5 of the draft *Framework on microbial health based targets* guides water utilities to be conservative when assessing source water for categorisation when there is a lack of data to support a full risk assessment. This guidance will result in potentially higher than necessary treatment requirements, resulting in inflated operational and infrastructure expenditure. Water utilities that do not have the population to support greater data collection and monitoring are not likely to be able to support these additional expenditures.

Additional support should be provided to these water utilities to ensure an accurate assessment is able to be made and capital expenditure therefore minimised.

2.3 Source Water Assessment

2.3.1 Source Water Assessment Methodology

When determining the source water classification a vulnerability assessment is completed; this aims to highlight weak areas in a system and to place the source water into one of four categories. Next, a Microbial Indicator Assessment is undertaken, whereby E.Coli data from raw water immediately prior to treatment is used to either confirm the vulnerability assessment or help decide between categories when the vulnerability assessment is not conclusive (See Table 1 and explanation below)

Table 1: Comparison of E.coli concentration with sanitary inspection category

Source Category Vulnerability Assessment	Microbial indicator concentration category Maximum E.coli per 100 ml			
	≤20 Category 1	> 20 ≤ 2,000 Category 2 &3	>2,000 ≤ 20,000 Category 4	>20,000 Not suitable for drinking
1	Source = Cat 1	Source = Cat 2	Anomalous	Not suitable
2	Source = Cat 2	Source = Cat 2	Anomalous	Not suitable
3	Anomalous	Source = Cat 3	Source = Cat 4	Not suitable
4	Anomalous	Source = Cat 4	Source = Cat 4	Not suitable

- If E.coli data and vulnerability assessment plot in a green box, the two assessments are consistent and the likelihood the category is correct is high.
- If E.coli and vulnerability assessment plot in an amber box, the results are feasible however there is a lower degree of confidence. E.coli data and sanitary survey should be re-examined to achieve better alignment or better understand the reason for the results.
- If the data plots in a red area then the data is anomalous and the categories should not be accepted. The process needs to be reassessed.

Interpreting Results – If E.coli reading ever fall above the microbial indicator concentration, the source water should be moved up a category so that it is treated adequately. However the inverse is not true. If a Category 4 source tests below 20 000 cells per 100 ml it should not be moved down in category. This follows the second principle in the ADWG to always be on the conservative side

2.3.2 Centroc Council’s Source Water Assessment

Due to the lack of exclusion zones and prevalence of cattle in most of Centroc member Councils’ catchments, applying the above vulnerability assessment methodology would result in most systems being placed into category 4. However, the microbial indicator assessment would place the same councils in category 2 or 3, and sometimes even into category 1. Faecal Coliform samples taken from one of the Centroc Council’s raw water intakes (a large dam) between January 2009 and October 2016 were mostly below 60, with only some results from storm events reported as ‘too numerous to count’. Yet this catchment is large and includes cattle and sheep farming and would likely be Category 4 otherwise.

2.4 USEPA SWTR

The United States Environmental Protection Agency have employed a similar system to the proposed HBT strategy for several years as part of their Surface Water Treatment Rules (SWTR), and lessons can obviously be learnt from their approach and experience.

Additionally, the USEPA’s SWTR were implemented at different rates and to different degrees depending on the size and financial capability of the various water authorities. Well financed, larger organisations can typically achieve higher targets much more rapidly than small remote ones. The larger organisations often also have voluntarily started putting new strategies into practice earlier, which puts them much closer to the end result than the smaller organisations by the time they are officially documented.

The SWTR also contain detailed tables so that calculation of LRV for viruses, bacteria, Giardia and Crypto can be readily calculated.

2.5 Turbidity

Table A5.4.1 in the draft HBT framework provides default LRV credits for various methods of filtration including direct and conventional filtration. Both of these filtration processes have 3 tiers of credits based on given individual filtrate turbidity targets, ≤ 0.15 NTU, ≤ 0.2 NTU and ≤ 0.3 NTU (for 95% of the month, and not > 0.5 NTU for 15 consecutive minutes), however no LRVs at all are given if turbidity is greater than these values. Disinfection is compromised when turbidity is > 1 NTU, therefore a sliding scale of LRV credits should be considered for 0.1 - 1 NTU.

Another consideration is the percentiles provided in the draft framework. Currently credit is only given if a target is met 95% of the month, however reduced LRV could be given if the percentiles are slightly reduced. A sliding scale between 75% and 100% would achieve this.

Many Centroc plants typically achieve 80% compliance with <0.5 NTU noting that whilst the data is compiled from results in the reticulation system, it is indicative nevertheless. This shows that more informed work needs to be undertaken with Centroc willing to work in partnership with the State Government to pilot this.

2.6 Other Factors

Turbidity is only an approximate measure of water quality and health and other parameters can be relevant also. Significant focus should be given to disinfection efficacy in the HBT process, including:

- Average chlorine residual and contact time;
- Average Ozone residual and contact time;
- UV dose and water clarity, etc.

In particular, several factors may contribute to health risk minimisation including:

- Large storage reservoirs (which can be improved by destratification or longer retention times);
- Pre-treatment (pre-chlorine, pre-ozone, settling);
- Optimisation techniques (such as those found in Water Research Australia's *Good Practice Guide to the Operation of Drinking Water Supply Systems for the Management of Microbial Risk - Research Project 1074*);
- Continuous operation without stopping and starting the WTP too often;
- The practice of not recycling waste water to the head of works or managing that recycle; and
- Avoiding extracting water from storm surges of poor quality raw water.

Additional treatment factors should be assigned default LRV credits and added to Appended section 5.4 in the draft HBT framework.

2.6.1 Stormwater and Extraction

The greatest health risk is usually associated with storm surges through a surface water system. The peak of the storm surge is typically laden with pathogens and impurities.

Key considerations during storm surges are:

- To let the high-risk storm surge pass as it may only last a few hours;
- Significant changes to WTP operation are required during this period and the operators need to be available and focused on the water treatment process in order to provide good quality water throughout;
- The WTP may need to operate at significantly reduced rates to cope with decrease in water quality;
- Plant specific historical records should be readily available and/or control systems which can help get to optimised operation very quickly;
- Early warning monitoring from rain gauges or in-river monitoring can warn operators to prepare for the event;
- Standard Operating Procedures (SOPs) for such events assist greatly and are better than using an ad hoc approach.

2.6.2 Water Recycling

Recycling wastewater to the head of the WTP saves water and often the environment but requires careful management to minimise health risk from recycled pathogens and possible other contaminants such as BGA toxins.

2.7 Reticulation Systems

The towns' reticulation needs to be appropriately maintained to minimise harbouring of potential pathogens. Chlorine can also be rapidly consumed in dirty reticulations, especially those with elevated pH. SOPs for mains repairs and disinfection, and minimising illegal connections are additional factors worthy of consideration.

2.8 Groundwater

Aquifers can be of various conditions and ages and should be assessed thoroughly in the HBT process. The bores may tap into slow or fast moving groundwater that may have been filtered through bedrock or not; the purity varies greatly. An assessment should be made including evaluation of the bore itself, especially whether it is locked off and excluded from any potential surface water incursions, especially during flooding.

3 Conclusions

Centroc provides qualified support for the introduction of HBTs noting that the following is needed:

- a well-considered approach covering as many relevant factors as possible;
- adequate support information to enable their implementation;
- a program of the rollout of compliance with HBTs with timing scaled for different organisations; big and small, remote and otherwise ;
- a plan of how funding will be provided by local, state and federal governments that considers collaboration with LWU's and alliances such as Centroc; and
- how the HBTs will be managed and enforced; can alternative approaches be taken or justified?

With drinking water quality for communities of Central NSW of the highest priority for the Centroc Board, at the October 2016 meeting, Centroc General Manager's resolved support for this region to work in collaboration with appropriate agencies to pilot a more informed approach to the proposed implementation of the HBT framework, including:

1. Examples of more remote and smaller water supply systems;
2. Examples of larger more high technology systems;

And in each case:

- what operational improvements can be made through training and optimised focus on issues with minimal capital improvement;
- what smaller cost capital improvements can be made that provide significant improvement;
- what larger capital and operational expenditure may be justified.

Thank you, again, for the opportunity to provide comment on the Draft Framework on Microbial Health Based Targets.

If you require further information or clarification on comments in this submission please contact Ms Meredith Macpherson, Program Manager , Centroc Water Utilities Alliance at meredith.macpherson@centroc.com.au or on 0427 451 085.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Bill West', with a long, sweeping underline.

Cr Bill West

Chair

Central NSW Councils (Centroc)