

Drinking Water Quality Management Plan (DWQMP) Annual Report

2014 – 2015

Dumaresq-Barwon Border Rivers Commission (BRC)

SPID: 370

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LGA covered by this plan: Southern Downs Regional Council

Water Supply Schemes covered by this plan: Glenlyon Dam drinking water scheme

Glossary of terms

ADWG 2004	Australian Drinking Water Guidelines (2004). Published by the National Health and Medical Research Council of Australia
ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
<i>E. coli</i>	<i>Escherichia coli</i> , a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
HACCP	Hazard Analysis and Critical Control Points certification for protecting drinking water quality
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
MPN/100mL	Most probable number per 100 millilitres
CFU/100mL	Colony forming units per 100 millilitres
<	Less than
>	Greater than
WTP	Water treatment plant

Document history and status

Revision	Date	Description	By	Review	Approved
A	25/11/2015	Initial Draft	James Harris (Jacobs)	Nicholas Stanton (Jacobs)	Nicholas Stanton (Jacobs)
B	25/11/2015	Draft for Internal Review	James Harris (Jacobs)	Maddy Kench (Jacobs)	Maddy Kench (Jacobs)
C	7/12/2015	Draft for Client Review	James Harris (Jacobs)	Gordon Delaney (SunWater) Umapati Yadav (SunWater)	
0	10/12/2015	Final Client Issue	James Harris (Jacobs)	Maddy Kench (Jacobs)	Maddy Kench (Jacobs)

1. Introduction

This report documents the performance of the Border River Commission's Glenlyon Dam drinking water service with respect to water quality and performance in implementing the actions detailed in the drinking water quality management plan (DWQMP) 2012-2015 as required under the *Water Supply (Safety and Reliability) Act 2008* (the Act).

The report assists the Regulator to determine whether the approved DWQMP and any approval conditions have been complied with and provides a mechanism for providers to report publicly on their performance in managing drinking water quality.

This report has been prepared in accordance with the *Water Industry Regulatory Reform – drinking water quality management plan report factsheet* published by the Department of Energy and Water Supply, Queensland, accessible at www.dews.qld.gov.au.

2. Overview of Operations

The Glenlyon Dam drinking water scheme sources water from Glenlyon Dam. The dam is owned by the Department of Natural Resources and Mines and is managed by the Border Rivers Commission.

SunWater is contracted for the asset management, operation and maintenance of the dam, the associated water treatment facilities and mains reticulation system for the provision of drinking water services to four houses, a small caravan park and day visitor / recreational areas together with associated sewage services (ie, picnic area toilets).

The water treatment process comprises of a multi-barrier three step process of;

- (i) Primary media filtration and storage
- (ii) Secondary filtration with organics removal through activated carbon media; and
- (iii) Two stage disinfection with UV and dosing by sodium hypochlorite.

The water treatment process, plant and equipment are essentially manually controlled by operating staff during day-light hours, with the exception of the automation of the sodium hypochlorite pump. This automatic chlorine dosing system maintains free chlorine residual levels above 0.5 mg/L in clear water tanks as part of the water treatment process.

The treated drinking water is stored in above ground tanks for later use on a two or three day production cycle, depending on demand for drinking water at the caravan park and picnic facilities at Glenlyon Dam. Water is disinfected before reticulation.

The daily drinking water demand is very seasonal, typically ranging from 10-40 kL/day, with maximum and minimum demand values of 300 and 18 kL/week.

3. Actions taken to implement the DWQMP

SunWater has implemented the DWQMP including setting operational limits, as defined in EM25 Water Treatment Plant Routine Inspection Checklist and EM25, Water Treatment Operations. Non-compliances with limits are investigated using SunWater's QM2 Incident reporting.

Progress in implementing the risk management improvement program

Appendix A of the approved Drinking Water Quality Management Plan outlines the Improvement Plan Actions. A brief status report of the progress of these actions is included in **Appendix B** of this annual report.

Revisions made to the operational monitoring program to assist in maintaining the compliance with water quality criteria¹ in verification monitoring.

The operational monitoring program has been reviewed; however, no revisions have been made over the past year.

Drinking water quality is tested in accordance with ADWG limits on a number of key parameters and monitored on two levels to ensure safe drinking water for consumers. The drinking water quality tests involve routine monthly testing of water chemistry (aesthetics) and micro-biology at a NATA accredited Laboratory, fortnightly testing for Cyanobacteria (BGA) on raw water samples at the Queensland Government phycology laboratory (located within the Department of Science, Information Technology and Innovation) and weekly/daily testing at the WTP Laboratory of water chemistry (aesthetics) and residual chlorine.

Three water quality sampling locations (test points) within the distribution system are utilised to provide high levels of overall confidence, guarantee and surety in the provision of safe drinking water quality to consumers. The sampling points were selected based on providing the highest probability of finding non-compliant drinking water in order to prevent a worst case scenario for a public health incident. The three water quality sampling points are located at the water treatment plant and at the end of the reticulation mains at the clear water tank(s), Caravan Park (Office) and Haigh Cottage (kitchen tap).

As these mitigation measures reduced “high” risks to risks of “medium” or “low” public risk, SunWater believes the current verification monitoring program is adequate.

Amendments made to the DWQMP

No amendments were made to the DWQMP between 1 July, 2014 and 30 June, 2015.

4. Compliance with water quality criteria for drinking water

The Glenlyon Dam drinking water scheme operates under SunWater’s standards EM25 and AM28 for Water Treatment Plants and Town Water Schemes. Under the *Water Supply (Safety and Reliability) Act 2008* the Dumaressq-Barwon Border Rivers Commission (BRC) (the entity responsible for Glenlyon Dam) is defined as a large water service provider.

The drinking water quality control parameters were developed from recommendations outlined in ADWG (2011). Table 4 (a): Drinking Water Quality Control Measures below shows the key parameters for operator testing and water quality acceptance. These parameters are tested at the WTP Laboratory for the three different water quality sampling points.

Table 4 (a): Drinking Water Quality Control Parameters

Parameter	Monitoring Frequency	Acceptable Limits
Residual chlorine (free)	Every 3 – 4 days	> 0.5 mg/L after 30 mins
Total chlorine	Every 3 – 4 days	< 5 mg/L
Raw Water pH	Every 3 – 4 days	N/A
Raw Water Turbidity	Every 3 – 4 days	N/A
Treated Water pH	Every 3 – 4 days	6.5 – 8.5
Treated Water Turbidity	Every 3 – 4 days	< 1 NTU

Micro-biological control testing is also required to ensure compliance with ADWG as well as the standards in the Public Health Regulation 2005. The parameters and frequency of the monitoring is shown below in Table 4 (b): Micro-biological control.

Table 4 (b): Micro-biological Control

Parameter	Monitoring Frequency	Acceptable Limits
E.Coli	Monthly	<1 CFU
Total Coliforms	Monthly	N/A – significant changes will be investigated
Heterotrophic Plate Count	Monthly	N/A – significant changes will be investigated

¹ Refer to *Water Quality and Reporting Guideline for a Drinking Water Service* for the water quality criteria for drinking water.

A summary of compliance with water quality criteria is included in Appendix A. This includes the following information:

- parameter
- unit of measure
- total number of samples collected
- number of samples that did not meet the water quality criteria
- maximum concentration or count

The water quality results over the 2014/15 financial year met the recommended values in the ADWG. The samples also met the recommended values outlined in the DWQMP with the exception of six (6) instances at the Caravan Park where turbidity levels were above the acceptable limit. While six (6) samples indicated free chlorine below 0.5 mg/L, these samples were taken at the extreme end of the network and a free chlorine residual was present in all of these samples. As this does not represent a breach of the limits (which is 0.5 mg/L after 30 mins), or a failure of disinfection, these instances were not reportable. The six (6) samples which exceeded the turbidity limit of 1 NTU prescribed in the DWQMP they did not exceed the ADWG limit of 5 NTU and were therefore not reportable. The water quality test results for E. coli all met the regulated target of nil detections.

5. Notifications to the Regulator under sections 102 and 102A of the Act

No notifications to the regulator under sections 102 and 102A of the Act were made between 1 July 2014 and 30 June 2015.

The following non-compliances with SunWater's water quality limits were noted but these were not reportable to the regulator.

- Haigh Cottage, 6 instances where free chlorine level was below 0.5 mg/L (This does not constitute a non-compliance as the limit of 0.5 mg/L after 30 minutes, not at the extreme limit of the network).
- Caravan Park, 6 instances where turbidity levels were above acceptable limit.

None of these instances required SunWater to issue a boil water or do not drink notice in the communities.

In this reporting period there were no instances that required notification to the Regulator under sections 102 or 102A of the Act. All micro-biological testing this financial year revealed that there were no instances where Escherichia coli (E. Coli) exceeded the acceptable limit of <1 CFU/100ml.

Non-compliances with the water quality criteria and corrective and preventive actions undertaken

As outlined above in the reporting period there were no instances that required notification to the Regulator under sections 102 or 102A of the Act. All micro-biological testing this financial year revealed that there were no instances where Escherichia coli (E. Coli) exceeded the acceptable limit of <1 CFU/100ml.

Prescribed incidents or Events reported to the Regulator and corrective and preventive actions undertaken.

As outlined above, in the reporting period there were no instances that required notification to the Regulator under sections 102 or 102A of the Act. All micro-biological testing this financial year revealed that there were no instances where Escherichia coli (E. Coli) exceeded the acceptable limit of <1 CFU/100ml.

6. Customer complaints related to water quality

SunWater is required to report on the number of complaints, general details of complaints, and the responses undertaken.

Throughout the year no complaints about water quality were received.

During 2014/15, there were no suspected or confirmed cases of illness arising from the water supply system.

7. Findings and recommendations of the DWQMP auditor

No audit has been conducted on the current DWQMP.

The next DWQMP audit is scheduled to be completed by the 1st August, 2017.

8. Outcome of the review of the DWQMP and how issues raised have been addressed

The next internal review of the DWQMP is due before 1st August, 2017.

Appendix A – Summary of compliance with water quality criteria

The results from the verification monitoring program have been compared against the levels of the water quality criteria specified by the Regulator in the *Water Quality and Reporting Guideline for a Drinking Water Service*.

The reported statistics do not include results derived from repeat samples, or from emergency or investigative samples undertaken in response to an elevated result.

The verification monitoring program was carried out as stated in the DWQMP

Table 1 - Verification monitoring results Glenlyon Dam Water Scheme.

Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	DWQMP Limit	Laboratory name
Residual chlorine (free)	mg/L	Every 3 – 4 days	115	115	0	0.32	3.8	1.81	> 0.5 mg/L after 30 mins	Glenlyon Dam WTP Laboratory
Total Chlorine	mg/L	Every 3 – 4 days	115	115	0	0.72	4.9	2.55	< 5 mg/L	Glenlyon Dam WTP Laboratory
Raw Water pH		Every 3 – 4 days	115	115	0	6.7	7.6	7	N/A	Glenlyon Dam WTP Laboratory
Raw Water Turbidity	NTU	Every 3 – 4 days	115	115	0	0.55	4.8	1.88	N/A	Glenlyon Dam WTP Laboratory
Treated Water pH		Every 3 – 4 days	115	115	0	3.7	7.4	7.16	6.5 – 8.5	Glenlyon Dam WTP Laboratory
Treated Water Turbidity	NTU	Every 3 – 4 days	115	109	6	0.16	1.69	0.43	< 1 NTU	Glenlyon Dam WTP Laboratory
E. Coli	CFU/100mL	Monthly	89	0	0	<1	<1	<1	<1 CFU	Laboratory Services Toowoomba
Total Coliforms	CFU/100mL	Monthly	12	12	0	<1	<1	<1	N/A – significant changes will be investigated	Laboratory Services Toowoomba
Heterotrophic Plate Count (HPC)	CFU/100mL	Monthly	12	12	0	1	17	3.04	N/A – significant changes will be investigated	Laboratory Services Toowoomba
Raw Water Arsenic	mg/L	Annually	1	0	0	<0.001	<0.001	<0.001	0.01 mg/L ADWG Limit	Laboratory Services Toowoomba
Raw Water Cadmium	mg/L	Annually	1	0	0	<0.0001	<0.0001	<0.0001	0.002 mg/L ADWG Limit	Laboratory Services Toowoomba
Raw Water Chromium	mg/L	Annually	1	0	0	<0.001	<0.001	<0.001	0.05 mg/L ADWG Limit	Laboratory Services Toowoomba
Raw Water Copper	mg/L	Annually	1	1	1	0.001	0.001	0.001	2 mg/L (health) 1 mg/L (aesthetic) ADWG Limits	Laboratory Services Toowoomba
Raw Water Lead	mg/L	Annually	1	0	0	<0.001	<0.001	<0.001	0.01 mg/L ADWG Limit	Laboratory Services Toowoomba
Raw Water Nickel	mg/L	Annually	1	0	0	<0.001	<0.001	<0.001	0.02 mg/L ADWG Limit	Laboratory Services Toowoomba
Raw Water Zinc	mg/L	Annually	1	1	1	0.014	0.014	0.014	3 mg/L (aesthetic) (no health limit) ADWG Limits	Laboratory Services Toowoomba

Raw Water Mercury	mg/L	Annually	1	0	0	<0.0001	<0.0001	<0.0001	0.001 mg/L ADWG Limit	Laboratory Services Toowoomba
Treated Water Arsenic	mg/L	Annually	1	0	0	<0.001	<0.001	<0.001	0.01 mg/L ADWG Limit	Laboratory Services Toowoomba
Treated Water Cadmium	mg/L	Annually	1	0	0	<0.0001	<0.0001	<0.0001	0.002 mg/L ADWG Limit	Laboratory Services Toowoomba
Treated Water Chromium	mg/L	Annually	1	0	0	<0.001	<0.001	<0.001	0.05 mg/L ADWG Limit	Laboratory Services Toowoomba
Treated Water Copper	mg/L	Annually	1	1	1	0.004	0.004	0.004	2 mg/L (health) 1 mg/L (aesthetic) ADWG Limits	Laboratory Services Toowoomba
Treated Water Lead	mg/L	Annually	1	0	0	<0.001	<0.001	<0.001	0.03 mg/L ADWG Limit	Laboratory Services Toowoomba
Treated Water Nickel	mg/L	Annually	1	0	0	<0.001	<0.001	<0.001	0.04 mg/L ADWG Limit	Laboratory Services Toowoomba
Treated Water Zinc	mg/L	Annually	1	1	1	0.006	0.006	0.006	3 mg/L (aesthetic) (no health limit) ADWG Limits	Laboratory Services Toowoomba
Treated Water Mercury	mg/L	Annually	1	0	0	<0.0001	<0.0001	<0.0001	0.001 mg/L ADWG Limit	Laboratory Services Toowoomba
Blue-Green Algae (BGA)	Cells/mL	Monthly	12	12	0	0	0	0	N/A	Phycology Laboratory (DSITI)

Table 2 (a) - Reticulation *E. coli* verification monitoring 2014

Escherichia coli public health compliance:
Calculation of 12 month 'rolling' annual value

Department of Environment
and Resource Management

Drinking water scheme: Glenlyon Dam Drinking Water Scheme

Year	2014											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected							2	2	2	2	2	2
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)							0	0	0	0	0	0
No. of samples collected in previous 12 month period												12
No. of failures for previous 12 month period												0
% of samples that comply												100.0%
Compliance with 98% annual value												YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The Public Health Regulation 2005 (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

The shaded out area is not applicable if data is not available for the previous 12 months.



Table 3 (b) - Reticulation *E. coli* verification monitoring 2015

***Escherichia coli* health compliance:**
Calculation of 12 month 'rolling' annual value

Department of Environment and Resource Management
Conserving and managing Queensland's environment and natural resources

Drinking water scheme: Glenlyon Dam Drinking Water Scheme

Year	2015											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	2	2	2	2	2	2						
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0						
No. of samples collected in previous 12 month period	14	16	18	20	22	24	22	20	18	16	14	12
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES											

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The Public Health Regulation 2005 (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).



Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Table 4 – Progress against the risk management improvement program in the approved DWQMP (2012-2015)

Item No.	HACCP Control Area	Hazard / Event	Recommendation / Preventative Measure	Target date/s	Status as at 30 June 2015	(If implementing these actions will take longer than anticipated, please provide detail, as it may affect the approved DWQMP)
1	Catchment	Changes in catchment land use - ROM minerals or hydrocarbons enter dam storage	Implement additional NATA Laboratory testing of raw water quality for heavy metals and hydrocarbon contamination against ADWG limits. The heavy metals that will be tested include Cd, Cr, Cu, Pb, Ni and Zn. Other parameters that will be tested are shown in Appendix E as an example. The frequency of testing will be carried out annually for characterisation of the raw water. Subject to the findings of the testing, complete a design study & business case for chemical treatment and removal of heavy metals	FY13/14	Complete	This testing is undertaken annually.
2	Operator / Management Training	1. Non-compliant or poor water quality & odours / bad tastes from micro-biological build up 2. Knowledge / technical expertise lost when operators / staff transition	Ensure all technical support, supervisory staff & WTP operators have attained certificate 3 standards. Conduct refresher training every 2 yrs. Increase the frequency of NATA drinking water quality testing	FY13/14	Ongoing	Existing SunWater operators have completed Certificate 3 training. The WTP is always under the supervision of a certificate 3 trained operator.
3	WTP - Storage Tanks Reticulation system	Bacteria (Ecoli)	WTP - Storage Tanks Reticulation system	FY13/14	Removed	SunWater has determined that Colitag testing will not add significant value in addition to the monthly bacteriological sampling programme.
4	Reticulation system	Turbidity / Taste	Investigate fitting of triple filters in SunWater staff cottages (dam sites), dam office & /or caravan park kiosk / other customers premises	FY13/14	Removed	SunWater has determined that this action is not an efficient and secure preventative measure and also will not provide protection to all customers. SunWater will instead continue to improve treatment capability and procedures at the treatment plant.
5	Operating Manual	Ecoli, Coliforms & HPC	Undertake a review of the operating manual to ensure consistency with standard WTP practices (ie, chlorination & backwashing). Conduct workshops and risk assessments every 2-3 yrs as part of the RCM approach to managing TWS assets and operations	FY13/14	Completed/Ongoing	Risk assessment was completed in 2015 prior to the submission of the latest DWQMP for approval by the regulator. This will be reassessed in 2-3 years as scheduled