

Diamantina Shire Council

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SUSTAINABLY DEVELOPING THE OUTBACK

Service Provider # 42

Drinking Water Quality Management Plan (DWQMP) Report

1 July 2016 – 30 June 2017

NOVEMBER 2017



DOCUMENT CONTROL

Date	Name	Position	Action required <i>(Review/Endorse/Approve)</i>
16/11/2017	T Balderson	Technical Officer	Draft
27/11/2017	William Green	Environmental Scientist	Approve

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Location 73 Elm Street, Barcaldine Qld 4725
Version no. 1.0
Version date 21 November 2017
Status Report
File/Doc no. 140182

Document control sheet

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GLOSSARY OF TERMS

ADWG	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
E. coli	<i>Escherichia coli</i> , a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
DSC	Diamantina Shire Council
mg/L	Milligrams per litre
DWQMP	Drinking Water Quality Management Plan
CFU/100mL	Colony forming units per 100 millilitres
ORWA	Outback Regional Water Alliance

INTRODUCTION

Pursuant to sections 99(2) (b) and 106 of the Act, regular reviews of the approved Drinking Water Quality Management Plan must be undertaken at specific intervals, this report documents the performance of Diamantina Shire Councils (DSC) drinking water service with respect to water quality and performance in implementing the actions detailed in the drinking water quality management plan (DWQMP) 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.

1. OVERVIEW OF OPERATIONS

Diamantina Shire covers an area of 95,000sq km with an overall population of approximately 350 people which swells significantly in the cooler months with travelling tourists. There are two operational water schemes in the shire in the towns of Birdsville and Bedourie, each town has a population of approximately 150 permanent residents. The administration centre of the shire is in Bedourie.

The systems are characterised by deep bores bringing hot water to the surface under pressure where the only treatment is cooling. Birdsville's Bore water is sourced from 1200m below ground level and emerges at a temperature of approximately 98°C. Birdsville has a dual reticulation system where non potable water is sourced from the Diamantina River when water is available. Bedourie's water is sourced from a bore approximately 400m deep and emerges at approximately 45°C.

In July 2013 DSC submitted a DWQMP demonstrating the commitment of council to managing its drinking water quality and complying with requirements of the *Water Supply (Safety and Reliability) Act 2008*, to protect public health by ensuring the provision of a safe water supply. The development of the DWQMP has documented potential risks associated with the operation of the water schemes and management strategies to safeguard drinking water quality for the public.

DSC has implemented a number of actions set out in the DWQMP to provide greater surety for the supply of safe drinking water for the Birdsville and Bedourie supply schemes. The application of a range of improvement items and management strategies that are set out in the DWQMP are identified in this report.

4.2 ACTIONS TAKEN TO IMPLEMENT THE DWQMP

4.1.2.1. Progress in Implementing the Risk Management Improvement Program

The information below presents the risks identified in the DWQMP Risk Management Improvement Program and the strategies that have been implemented to reduce these risks and ensure the provision of drinking water quality in the DSC's water schemes.

<u>Item No.</u>	<u>Scheme/ Component</u>	<u>Improvement Item</u>	<u>Actions</u>	<u>Status at June 2017</u>
2.1.1	Birdsville Distribution System	Bacterial or chemical contamination of water supply in power station prior to delivery to Council	A risk Assessment Workshop with DSC and Ergon Energy was conducted in April 2014 to assess the potential for drinking water contamination to occur through the release of isopentane to the drinking water from the Birdsville Organic Rankine Cycle (ORC) Geothermal Powerstation. The workshop has effectively investigated and assessed the risks of potential contamination from the plant as low and have also identified control measures in the unlikely event of contamination occurring.	Complete
2.1.2	Birdsville Distribution System	Bacterial Contamination from working on finished water pumps, heat exchanger.	The Work Method Statement on Water and Sewer Repairs Developed in April 2015. Maintenance and New Construction for DSC outlines preventative controls for this hazard with reference to the ADWG.	Complete
2.1.3	Bedourie Water Source	Loss of supply due to Bore Failure	<p>Bedourie's town bore supplies the entire town with potable water and has been operating for over 100 years. A failure of this bore would have drastic consequences for the town. To mitigate the risk of bore failure the following precautions have been undertaken:</p> <ul style="list-style-type: none"> - CCTV inspections of the bore every five years to assess the condition of the bore conducted 2012 and 2017 - Pressure and flow has been monitored and any changes to these conditions have been investigated - An investigation has been completed on alternative water supply options for Bedourie with recommendations September 2015 - In Nov 2017 Council resolved to seek funding to replace the Bedourie bore in the 2019/20 financial year. 	Complete

2.1.4	Birdsville Water Source	Birdsville bore water fluoride concentration above guideline limit	<p>The sampling of the water quality at the bore-head of Birdsville has obtained an average result for Fluoride of 1.75mg/L while ADWG has a limit of 1.5mg/L. According to the ADWG, the risk from exceeding the limit is the potential for dental fluorosis in children of ages up to 6 or 8 years when exposed over an extended period time.</p> <p>In response to the high fluoride results obtained from the Drinking Water Monitoring Program the drinking water regulator required Diamantina Shire Council to distribute a media release facts sheet regarding the high fluoride levels, a facts sheet was sent to all Birdsville residents in June 2014 advising parents to provide rainwater or bottled water for children under the age of six to limit or prevent dental fluorosis.</p>	Complete
2.1.5	Birdsville& Bedourie Water Distribution	Pipe breakage in cooling pond – contaminant entry during shut-down	<p>The upgrade of dated infrastructure in the cooling pond area was identified as a high priority by the DSC due to the risk of contamination from maintenance operations. Upgrades to the cooling ponds facilities were undertaken between 2012 and 2013, replacing galvanised pipes with an improved copper pipe system. The Work Method Statement on Water and Sewer Repairs, Maintenance and New Construction for DSC outlines preventative control for this hazard with reference to the Practical Guide to the Operation and Optimisation of Distribution Systems, WIOA-05 (2012).</p>	Complete
2.1.6	Birdsville& Bedourie Water Distribution	Bacterial contamination of supply during repairs to reticulation system	<p>DSC's Work Method Statement developed in 2015 covers training of staff on good hygiene practices for pipe repairs in the distribution systems. The disinfection and flushing procedure for contaminated areas of pipes or new pipelines is explained in the Work Method Statement.</p>	Complete
2.1.7	Birdsville Water Distribution	Ingress of contamination in Birdsville from cross-connection to untreated river water system	<p>The dual reticulation system in Birdsville delivering both potable and non-potable water has been constructed to ensure that cross contamination between systems is avoided through engineered design. The reticulation system for the non-potable river water has been designed so that the water pressure is significantly less than the potable water system to ensure that if a cross connection took place, the pressure variance between the two lines would ensure that water in the non-potable line would not have the pressure required to flow into the potable water line.</p>	Complete

2.1.8	Birdsville& Bedourie System Wide	Water network drawings are not up to date	DSC has updated the drawings (July 2016 most recent update) of the water networks for Birdsville and Bedourie water systems for the benefit of asset management and operational tasks.	Complete
2.1.9	Birdsville& Bedourie Water Storage & Distribution	Illegal access to finished water supply infrastructure or storage reservoirs	The development of a Work Method Statement by DSC has identified the risk of unauthorised access to water infrastructure in Bedourie and Birdsville. The successful implementation of the WMS requires shire staff to identify the risk of unauthorised entry, install necessary security measures in place and ensure that security gates, hatches and ladder shrouds are kept locked and in good working order. These works have been completed by shire staff.	Complete
2.1.10	Birdsville& Bedourie Water Distribution	Floods may prevent road transport when bacteriological sampling is indicated	In times where floods occur and roads are inaccessible and DSC staff are unable to conduct routine E. coli monitoring in accordance with DSC's Procedure for Water Quality Monitoring (E. coli), the Procedure for Water Quality Monitoring has specified that the samples may be transported by air freight which operates twice per week. Also, the recent procurement of the Colilert 18 water testing device has allowed shire staff to test water at the depot in Bedourie making the testing process much simpler and allows greater opportunity to follow monthly testing schedules.	Complete
2.1.11	Birdsville& Bedourie System Wide	Implementation of a Drinking Water Quality Operations Plan	An investigation of the utilisation of the DWQMP determined the objectives and operational requirements were not clearly understood by operational staff and the DWQMP was not being utilised to its full extent. As a result of this investigation it was decided by council management that a DWQMP Operating Plan would be drafted in order to summarise the requirements of the DWQMP for operational staff, this document was completed in October 2015.	Complete

2.1.12	Birdsville& Bedourie System Wide	Review of Verification Monitoring Program	In Early 2017 as part of an ORWA initiative a verification monitoring rationalisation project was conducted. For this project historical data was analysed to determine if records provided an indication of continual low or non-detection values were present, providing reason for discontinued testing of some analytes. The findings of this project are to be considered in the 2017 DWQMP review.	Complete
2.1.13	Birdsville& Bedourie System Wide	Amendments made to the DWQMP	In January 2017 an amended DWQMP was approved by the regulator. The amendment was conducted primarily to document recommended changes made to the Verification Monitoring Program based on an independent assessment of water the water testing programs in place. The amendment also updated verification monitoring data to include the data up to mid-2016.	Complete

4.1.1. Improvement Item 1 – Bacterial or chemical contamination of water supply in power station prior to delivery to Council

A risk Assessment Workshop with DSC and Ergon Energy was conducted to assess the potential for drinking water contamination to occur through the release isopentane to the drinking water from the Birdsville Organic Rankine Cycle (ORC) Geothermal Powerstation. The workshop has effectively investigated and assessed the risks of potential contamination from the plant as low and have also identified control measures in the unlikely event of contamination occurring.

Improvement Item 2 – Bacterial Contamination from working on finished water pumps, heat exchanger.

The Work Method Statement on Water and Sewer Repairs, Maintenance and New Construction for DSC outlines preventative controls for this hazard with reference to the ADWG.

4.1.2. Improvement Item 3 – Loss of supply due to Bore Failure

Bedourie's town bore supplies the entire town with potable water and has been operating for over 100 years. A failure of this bore would have drastic consequences for the town.

To mitigate the risk of bore failure the following precautions have been undertaken:

- CCTV inspections of the bore every five years to assess the condition of the bore
- Pressure and flow has been monitored and any changes to these conditions have been investigated
- An investigation has been completed on alternative water supply options for Bedourie with recommendations

4.1.2. Improvement Item 4 – Birdsville bore water fluoride concentration above guideline limit

The sampling of the water quality at the bore head of Birdsville has obtained an average result for Fluoride of 1.75mg/L while ADWG has a limit of 1.5mg/L. According to the ADWG, the risk from exceeding the limit is the potential for dental fluorosis in children of ages up to 6 or 8 years when exposed over an extended period time.

In response to the high fluoride results obtained from the Drinking Water Monitoring Program the drinking water regulator required Diamantina Shire Council to distribute a media release facts sheet regarding the high fluoride levels, a facts sheet was sent to all Birdsville residents in June 2014 advising parents to provide rainwater or bottled water for children under the age of six to limit or prevent dental fluorosis.

4.1.2. Improvement Item 5 – Pipe breakage in cooling pond – contaminant entry during shut-down

The upgrade of dated infrastructure in the cooling pond area was identified as a high priority by the DSC due to the risk of contamination from maintenance operations. Recent upgrades to the cooling ponds facilities have been undertaken, replacing galvanised pipes with an improved copper pipe system

5.3. COMPLIANCE WITH WATER QUALITY CRITERIA FOR DRINKING WATER

5.1.3.1. Bedourie Drinking Water Scheme Water Quality Results 2016 – 2017

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Bedourie Water Quality Test Results							
Analyte	Scheme Component	Sampling Frequency	Number of Samples	Samples Exceeding Guidelines	Min	Max	Average
E coli (orgs/100mL)	Distribution system	Monthly	36	0	0	0	0
pH	Source Water	Biannually	2	0	8.2	8.3	8.24
Dissolved Oxygen (mg/L)	Source Water	Biannually	1	0	3.9	3.9	3.9
Total dissolved solids (mg/L)	Source Water	Biannually	2	0	550	560	547.50
Sodium (mg/L)	Source Water	Biannually	2	2	190	210	202
Chloride (mg/L)	Source Water	Biannually	2	0	84	89	88
Fluoride (mg/L)	Source Water	Biannually	2	0	0.68	0.78	0.76
Sulphate (mg/L)	Source Water	Biannually	1	0	<.5	<.5	-
Manganese (µg/L)	Source Water	Biannually	2	0	0.012	0.012	0.012
Iron (µg/L)	Source Water	Biannually	2	0	0.05	0.05	0.05
Aluminium (µg/L)	Source Water	Biannually	2	0	<0.005	0.006	
Antimony (µg/L)	Source Water	Biannually	2	0	<0.002	<0.002	-
Barium (µg/L)	Source Water	Biannually	2	0	0.066	0.067	0.065
Boron (µg/L)	Source Water	Biannually	2	0	0.19	0.19	0.19
Cadmium (µg/L)	Source Water	Biannually	2	0	0.0002	<0.0001	-
Copper (µg/L)	Source Water	Biannually	2	0	1	1.4	1.2
Lead (µg/L)	Source Water	Biannually	2	0	<0.001	<0.001	-
Molybdenum (µg/L)	Source Water	Biannually	2	0	<0.01	<0.01	-
Mercury (mg/L)	Source Water	Biannually	2	0	<0.00005	<0.00005	-
Nickel (µg/L)	Source Water	Biannually	2	0	<0.001	<0.001	-
Arsenic (µg/L)	Source Water	Biannually	2	0	<0.003	<0.003	-
Cyanide (mg/L)	Source Water	Biannually	1	0	<0.04	<0.04	-
Silver (µg/L)	Source Water	Biannually	2	0	<0.0001	<0.0001	-
Selenium (µg/L)	Source Water	Biannually	2	0	<0.003	<0.003	-
Uranium (µg/L)	Source Water	Biannually	2	0	<0.001	<0.001	-
Zinc (µg/L)	Source Water	Biannually	2	0	<0.005	<0.005	-

ADWG Aesthetic Threshold

5.2.3.2. Birdsville Drinking Water Scheme Water Quality Results 2016 – 2017

Birdsville Water Quality Test Results							
Analyte	Scheme Component	Sampling Frequency	Number of Samples	Samples Exceeding Guidelines	Min	Max	Average
<i>E coli</i> (orgs/100mL)	Distribution system	Monthly	36	0	0	0	0
pH	Source Water	Biannually	2	0	8	8	8
Dissolved Oxygen (mg/L)	Source Water	Biannually	1	0	5.3	5.3	5.3
Total dissolved solids (mg/L)	Source Water	Biannually	2	0	480	529	505
Sodium (mg/L)	Source Water	Biannually	2	1	180	190	185
Chloride (mg/L)	Source Water	Biannually	2	0	55	55	55
Fluoride (mg/L)	Source Water	Biannually	2	0	1.5	1.5	1.5
Sulphate (mg/L)	Source Water	Biannually	2	0	1.1	1.2	1.1
Manganese (µg/L)	Source Water	Biannually	2	0	5	16	68
Iron (µg/L)	Source Water	Biannually	2	0	16	19	17.5
Aluminium (µg/L)	Source Water	Biannually	2	0	36	39	33.4
Antimony (µg/L)	Source Water	Biannually	2	0	<0.001	<0.001	-
Barium (µg/L)	Source Water	Biannually	2	0	170	170	170
Boron (µg/L)	Source Water	Biannually	2	0	490	540	528.57
Cadmium (µg/L)	Source Water	Biannually	2	0	<0.1	<0.1	-
Copper (µg/L)	Source Water	Biannually	2	0	1	240	202.71
Lead (µg/L)	Source Water	Biannually	2	0	<1	<1	-
Molybdenum (µg/L)	Source Water	Biannually	2	0	<1	1	-
Mercury (mg/L)	Source Water	Biannually	2	0	<0.0001	<0.0001	-
Nickel (µg/L)	Source Water	Biannually	2	0	<1	<1	-
Arsenic (µg/L)	Source Water	Biannually	2	0	<1	<1	-
Cyanide (mg/L)	Source Water	Biannually	1	0	<.004	<.004	-
Silver (µg/L)	Source Water	Biannually	2	0	<1	<1	-
Selenium (µg/L)	Source Water	Biannually	2	0	<1	<1	-
Uranium (µg/L)	Source Water	Biannually	2	0	<1	<1	-
Zinc (µg/L)	Source Water	Biannually	2	0	<5	22	-

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ADWG Aesthetic Threshold

5.3.3.3. Summary of Results

Bacteriological sampling for both Bedourie and Birdsville has recorded no positive results since the implementation of the DWQMP, sampling has taken place on a monthly basis in three locations in the distribution system.

Elevated levels of fluoride detected in Birdsville's drinking water have been identified as a hazard in DSC's DWQMP and a potential risk to water quality which is due to the underlying geology in the area causing naturally high levels in the water supply. DSC has an ongoing incident (DWI-7-42-00003) for fluoride exceedance's reported in February 2016. In the 2016/17 reporting period Birdsville's fluoride values were lower than average, the verification monitoring values were 1.5 mg/L, not exceeding the ADWG health thresholds.

For both Bedourie and Birdsville there was an exceedance of ADWG aesthetic values for Sodium, both schemes marginally exceeded the aesthetic guideline, Bedourie had 2 exceedance's of 190 and 2010mg/L and Birdsville had a single exceedance of 190mg/L.

6.4. NOTIFICATIONS TO THE REGULATOR UNDER SECTIONS 102 AND 102A OF THE ACT

No notifications were required to the regulator over the 2016/17 reporting period.

7.5. CUSTOMER COMPLAINTS RELATED TO WATER QUALITY

No complaints have been received over the 2016/17 reporting period.

8.6. FINDINGS AND RECOMMENDATIONS OF THE DWQMP AUDITOR

Since the implementation of the DWQMP there has not been an audit conducted. The first regular audit of the plan is due by the second of June 2018, prior to this date an audit will be conducted and findings appraised.

9.7. OUTCOME OF THE REVIEW OF THE DWQMP AND HOW ISSUES RAISED HAVE BEEN ADDRESSED

The next internal review of the DWQMP is due by December 2017.