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Annual Drinking Water Quality Report

1 January 2016 to 31 December 2016



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Essential Water produces this report to inform Essential Water customers about water quality. Essential Water tests and monitors water quality during various stages of the storage and distribution system to ensure that the Australian Drinking Water Guidelines are met.

Essential Water's assessment, based on our water quality test results for this period, indicates that drinking water quality has complied with all the health and aesthetic values in the Australian Drinking Water Guidelines (ADWG) 2013.

The ADWG 2013 recognise that occasionally there may be health or aesthetic related test results that fall outside the guidelines and that these results are not necessarily an immediate threat to health. The guidelines do not require a 100% result in all cases. All test results above the guidelines are investigated and actions, if necessary, taken.

For more information please call in and see us at our Block 10 Water Depot, contact us on **13 23 91** or visit www.essentialwater.com.au.

What is our aim?

Essential Water is committed to providing safe, secure, reliable and high quality water to our customers.

How do we test water quality?

Water samples are taken from 38 locations including the reservoirs, at the inlet and outlet of the water filtration plant, and from various other locations throughout our water network. Independent laboratories certified to the National Association of Testing Authorities (NATA) standards carry out all testing, and the results are reviewed by NSW Health.

In the attached table you will find a summary of the test results for samples collected from the Broken Hill Water Treatment Plant and locations throughout our network over the reporting period (1 January 2016 to 31 December 2016).

What is tested?

Your water is tested for up to 70 different characteristics including taste, colour, odour, micro-organisms and chemical content. This report is a summary of a selection of the health, chosen in consultation with NSW Health and aesthetic characteristics.

What are the water guidelines we must meet?

Australian Drinking Guidelines (ADWG) 2013 is set by the National Health and Medical Research Council (NHMRC) and the National Resource Management Ministerial Council (NRMCC). The ADWG is part of the National Water Quality Management Strategy.

The role of Essential Water is to ensure that safe drinking water is supplied to meet all guidelines.



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Table 1: Broken Hill annual drinking water quality report 1 January 2016 to 31 December 2016

BROKEN HILL 2016 TREATED WATER								
Characteristics		No. Samples	Min	Avg	Max	ADWG	% Passed	Comply
Health	E.Coli	102	< 1	< 1	< 1	0 orgs / 100 mL (100%)	100%	Y
	Fluoride **	12	0.3	0.9	1.1	0.9 to 1.5 mg/L	100%	Y
	Free Chlorine	102	0.1	1.6	3.4	0.2 to 5 mg/L	96%	Y
	Lead	12	<0.002	<0.002	0.008	<0.01 mg/L	100%	Y
	Arsenic	12	0.001	0.002	0.004	<0.01 mg/L	100%	Y
	Manganese	12	0.005	0.009	0.012	<0.5 mg/L	100%	Y
	Cadmium	12	< 0.0005	< 0.0006	< 0.0007	<0.002 mg/L	100%	Y
	Copper	12	< 0.005	0.005	0.04	< 2 mg/L	100%	Y
	Mercury	12	< 0.0001	0.0001	0.0004	<0.001 mg/L	100%	Y
Trihalomethanes	11	0.080	0.132	0.202	<0.250 mg/L	100%	Y	
Aesthetic	Turbidity	12	< 0.1	0.2	0.8	< 5 NTU	100%	Y
	True Colour	0	< 1	0.9	2	15 HU	100%	Y
	pH	114	7.1	7.5	8.1	pH 6.5-8.5	100%	Y
	EC***	24	385	853	1231	<1090 µS/cm	75%	Y
	Iron	12	< 0.01	0.01	0.04	<0.3 mg/L	100%	Y
	Zinc	12	<.01	0.01	0.03	< 3 mg/L	100%	Y

* Filtered Water is defined as the water leaving the Water Treatment Plant or within the treated water reticulation.

** ADWG 2013, health guideline for fluoride is upper limit of 1.5mg/L.

*** ADWG 2013, salinity measure of 'good quality' is 600TDS converts to 1090EC

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1 Glossary*

Australian Drinking Water Guidelines (ADWG) – The *Australian Drinking Water Guidelines* (the ADWG) are intended to provide a framework for good management of drinking water supplies that, if implemented, will assure safety at point of use. The ADWG have been developed after consideration of the best available scientific evidence. They are designed to provide an authoritative reference on what defines safe, good quality water, how it can be achieved and how it can be assured. They are concerned both with safety from a health point of view and with aesthetic quality.

Arsenic – *Based on human health considerations, the concentration of arsenic in drinking water should not exceed 0.01 mg/L.*

Cadmium – *Based on health considerations, the concentration of cadmium in drinking water should not exceed 0.002 mg/L.* Contamination of drinking water by cadmium may occur as a result of impurities in the zinc of galvanised pipes or in solders used in fittings, water heaters, water coolers and taps.

Chlorine – *Based on health considerations, the guideline value for total chlorine in drinking water is 5 mg/L.* When used as a disinfectant, the free chlorine residual in major Australian reticulated supplies ranges from 0.1 mg/L to 4 mg/L, with typical concentrations in the reticulation of about 0.2 to 0.4 mg/L.

Essential Water comment: If a low reading of chlorine is detected in the reticulation system, personnel attend the site and flush until chlorinated water concentration of 0.5 mg/L is attained.

Copper – *Based on health considerations, the concentration of copper in drinking water should not exceed 2 mg/L.* *Based on aesthetic considerations, the concentration of copper in drinking water should not exceed 1 mg/L.* Copper is present in uncontaminated surface waters at very low concentrations, usually less than 0.01 mg/L.

Escherichia coli (E. coli) – bacterium found in the gut, used as an indicator of faecal contamination of water. *E. coli* should not be detected in a minimum 100 mL sample of drinking water. In practice, *E. coli* may occasionally be present in drinking water in the absence of any identifiable source of faecal contamination. Nevertheless, if samples taken are found to contain *E. coli*, the response to each detection should be rigorous.

Electrical Conductivity (EC) – *No specific health guideline value is provided for total dissolved solids (TDS), as there are no health effects directly attributable to TDS. However for good palatability total dissolved solids in drinking water should not exceed 600 mg/L (1090EC).* As a rough guide, electrical conductivity, measured in micro Siemens per cm ($\mu\text{S}\cdot\text{cm}^{-1}$, also known as EC, or electro conductivity units), is multiplied by (a factor¹) to estimate TDS. Inferring a TDS value therefore has to be based on local circumstances.

Essential Water comments: ¹The conversion factor for Broken Hill water is 0.55. Fair quality water ranges to 900TDS (1640EC).

Fluoride – Drinking water is fluoridated to reduce the occurrence of dental caries. Occurs naturally in some water from fluoride-containing rocks. Often added at up to 1 mg/L to protect against dental cavities. >1.5 mg/L can cause dental fluorosis. The health guideline value is <1.5 mg/L.

Iron – *Based on aesthetic considerations (precipitation of iron from solution and taste), the concentration of iron in drinking water should not exceed 0.3 mg/L.* Iron has a taste threshold of about 0.3 mg/L in water, and becomes objectionable above 3 mg/L.

Lead – *Based on health considerations, the concentration of lead in drinking water should not exceed 0.01 mg/L.* In major Australian reticulated supplies, total lead concentrations range up to 0.01 mg/L, with typical concentrations less than 0.005 mg/L.

Manganese – *Based on aesthetic considerations, the concentration of manganese in drinking water should not exceed 0.1 mg/L, measured at the customer's tap.* Manganese would not be a health consideration unless the concentration exceeded 0.5 mg/L. At concentrations exceeding 0.1 mg/L, manganese imparts an undesirable taste to water and stains plumbing fixtures and laundry.

Maximum – The highest recorded reading.

Minimum – The lowest recorded reading.

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Mercury - Based on health considerations, the concentration of total mercury in drinking water should not exceed 0.001 mg/L. Food is the main route of exposure, with highest concentrations found in fish and fish products. The average Australian adult dietary intake of mercury is approximately 0.004 mg per day. Drinking water is likely to constitute only a small fraction of total intake.

pH - Based on the need to reduce corrosion and encrustation in pipes and fittings, the pH of drinking water should be between 6.5 and 8.5. Chlorine disinfection efficiency is impaired above pH 8.0. When pH is below 6.5 or above 11, the water may corrode plumbing fittings and pipes.

Reservoir - An artificial body of water.

Trihalomethanes (THMs) - Based on health considerations, the concentration of trihalomethanes, either individually or in total, in drinking water should not exceed 0.25 mg/L. Trihalomethane concentrations fluctuating occasionally (for a day or two annually) up to 1 mg/L are unlikely to pose a significant health risk. Action to reduce THMs is encouraged, but must not compromise disinfection, as non-disinfected water poses significantly greater risk than THMs.

True Colour - Based on aesthetic considerations, true colour in drinking water should not exceed 15 HU. Badly corroded iron pipes can produce a brownish colour whereas corrosion of copper pipes can produce a blue-green colouration on sanitary ware and a faint blue colour in water in extreme cases. The condition of household pipes can significantly influence water colour.

Turbidity - 5 NTU is just noticeable in a glass. <0.2 NTU is the target for effective filtration of Cryptosporidium and Giardia. <1 NTU is the target for effective disinfection. The aesthetic guideline for turbidity is <5 NTU.

Zinc - Based on aesthetic considerations (taste), the concentration of zinc in drinking water should be less than 3 mg/L. No health-based guideline value is proposed for zinc. Taste problems can occur if the zinc concentration in drinking water exceeds 3 mg/L.

**Glossary definitions adapted from the ADWG (Revision 2013).*