



BUSSELTON WATER

BUSSELTON WATER
Report to the Department of Health
for the period

1 October to 31 December 2017

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Submitted to:
The Advisory Committee for the Purity of Water
Busselton Water's Website
CEO, Busselton Water (Mr Chris Elliott)



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1.0 Water Provider Information

Water Provider Contact Details			
Name of Company	Busselton Water		
Company Address	1 Fairbairn Road, Busselton WA 6280		
Company Phone	08 9781 0500	Fax	08 9754 1075
Company Email	admin@busseltonwater.wa.gov.au		
Chief Executive Officer	Chris Elliott		
DoH Liaison Officer	Peter Addison, General Manager Operations		

1.1 System Information

Busselton Water operates one large interconnected water supply system with four bore sites consisting of eight production bores, supplying three water treatment plants. Busselton Water operates its distribution system as one locality ("Busselton") and has strategically-placed sampling points throughout the distribution system.

Busselton Water's water supply is sourced from bores constructed in the Leederville and Yarragadee aquifers. The raw groundwater has turbidity and total iron concentrations above the drinking water guideline limits but these are readily removed by oxidation, aeration and filtration, and then disinfected at Busselton Water's treatment plants before distribution into the reticulation network.

Busselton Water supplies potable water to more than 26,000 customers within the Busselton townsite and close environs such as Port Geographe, Siesta Park, Vasse and Wonnerup. As a sought-after tourist destination this figure can rise significantly during weekends and holiday periods. The average daily system demand for the reporting period was 18.9ML/day.

2.0 Performance Summary

2.1 Treated Water – Microbiological Water Quality

Microbiological water quality analyses for treated water samples are collected downstream of the chlorinators at the water treatment plants. Compliance limits are summarised in the following table.

Sixty-five samples were tested for thermotolerant coliforms and *E. coli* and 60 samples were tested for Thermophilic *Naegleria* during the fourth quarter of 2017 (October to December). No microbial activity in relation to these parameters was detected during the three months at any of the sample locations. Busselton Water remains 100% compliant with the 2004 Australian Drinking Water Guidelines and the Memorandum of Understanding with the Department of Health in respect to *E. coli* and *N. fowleri*¹.

Period	<i>Escherichia coli</i> (<i>E. Coli</i>)				Thermophilic <i>Naegleria</i>			<i>Naegleria fowleri</i> ¹		
	No. of Samples	No. of Non-conforming Samples	Maximum Individual Value	Rolling 12 Months Compliance	No. of Samples	Detected	Rolling 12 Months Compliance	No. of Samples	Detected	Rolling 12 Months Compliance
Oct-17	25	0	est <1	100%	25	0	100%	0	-	100%
Nov-17	20	0	est <1	100%	20	0	100%	0	-	100%
Dec-17	20	0	est <1	100%	15	0	100%	0	-	100%
Total for Fourth Quarter 2017	65	0	-	-	60	0	-	0	-	-
Fourth Quarter 2017 Compliance	100%			-	100%		-	100%		-
Required Compliance (ADWG 2004) (MOU 2011)	100%				95%			100%		

Note 1: Tests for *Naegleria Fowleri* only required if Thermophilic *Naegleria* is detected.

Note 2 Sampling for Thermophilic *Naegleria* was not undertaken during the last week of December 2017, as the PathWest Laboratory (subcontracted by SGS Australia to undertake analysis of this sampling for Busselton Water) was closed between Christmas and New Year.

2.2 Distributed Water - Microbiological Water Quality

Microbiological water quality analyses for the seven locations within the distribution system are sampled weekly and are summarised in the following table.

Ninety-one samples were tested for thermotolerant coliforms and *E. coli* and 84 samples were tested for Thermophilic *Naegleria* during the fourth quarter of 2017 (October to December). No microbial activity in relation to these parameters was detected during the three months at any of the sample locations. Busselton Water remains 100% compliant with the 2004 Australian Drinking Water Guidelines and the Memorandum of Understanding with the Department of Health in respect to *E. coli* and *N. fowleri*¹.

Period	<i>Escherichia coli</i> (<i>E. Coli</i>)				Thermophilic <i>Naegleria</i>			<i>Naegleria fowleri</i> ¹		
	No. of Samples	No. of Non-conforming Samples	Maximum Individual Value	Rolling 12 Months Compliance	No. of Samples	Detected	Rolling 12 Months Compliance	No. of Samples	Detected	Rolling 12 Months Compliance
Oct-17	35	0	est <1	100%	35	0	100%	0	-	100%
Nov-17	28	0	est <1	100%	28	0	100%	0	-	100%
Dec-17	28	0	est <1	100%	21	0	100%	0	-	100%
Total for Fourth Quarter 2017	91	0		-	84	0	-	0	-	-
Fourth Quarter 2017 Compliance	100%			-	100%		-	100%		-
Required Compliance (ADWG 2004) (MOU 2011)	98%				95%			100%		

Note 1: Tests for *Naegleria Fowleri* only required if Thermophilic *Naegleria* is detected.

Note 2 Sampling for Thermophilic *Naegleria* was not undertaken during the last week of December 2017, as the PathWest Laboratory (subcontracted by SGS Australia to undertake analysis of this sampling for Busselton Water) was closed between Christmas and New Year.

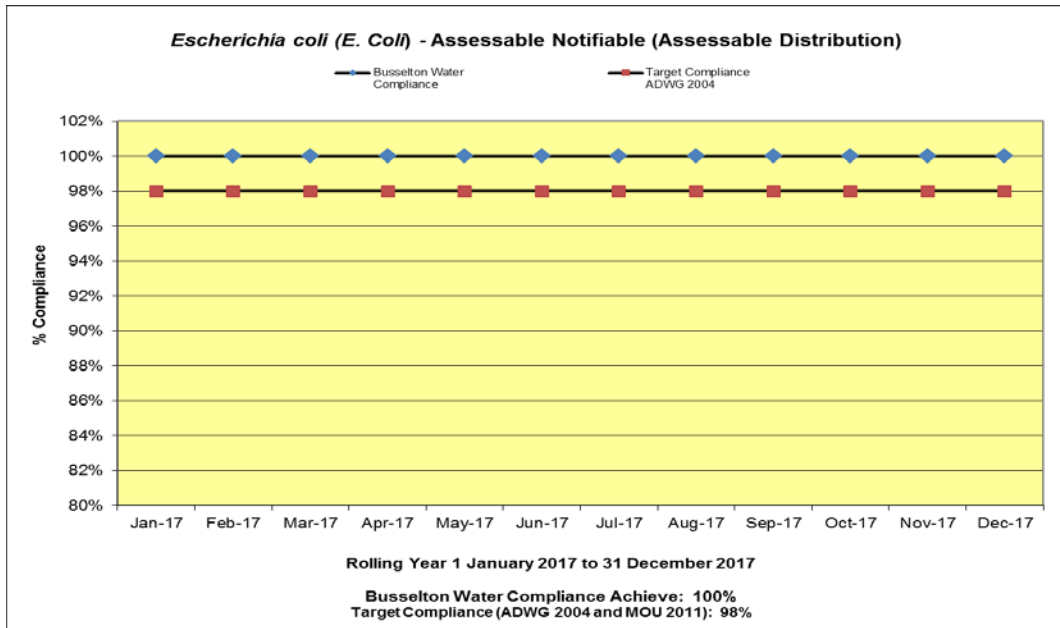
3.0 Microbial Performance (Rolling 12 Months ending 31 December 2017)

3.1 Microbiological - Exception Notifications

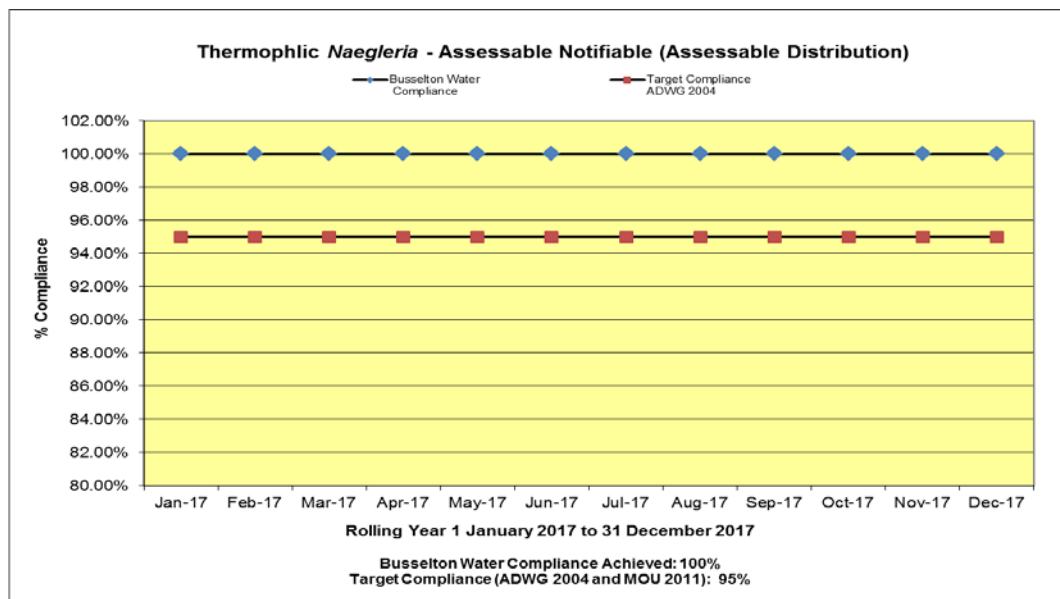
Microbiological Water Quality Exceptions							
Region/Scheme/ Zone/ Service Provider	Population Served	Date	Microbiological Characteristic	MoU Alert Level	Remedial Action	DoH Notified	Close Out Date
Busselton	>26,000	01/01/2017 to 31/12//2017			NIL		

3.2 Microbiological Charts - Busselton

3.2.1 *Escherichia coli* (E. Coli) – Distribution System



3.2.2 Thermophilic *Naegleria* – Distribution System



3.3 Microbiological Incident Specific Information

Microbiological Incidents				
Region/Scheme/ Zone/ Service Provider	Date of Incident	Details of Incident	MoU Alert Level	Remedial Action
Busselton	NIL			

4.0 Chemical – Health Related Performance

The results of water samples collected from the operating production bores (raw water) and at the assessable distribution sampling points (distribution water) during the fourth quarter of 2017 (October to December) are summarised in Table 4.2 for health related guidelines. They show that the water supply is 100% compliant with the 2004 health-related guidelines for drinking water, the operating licence issued by the ERA, the protocols of Busselton Water's Memorandum of Understanding with the Department of Health and the groundwater licence issued by the Department of Water.

4.1 Chemical – Health Related – Exception Notifications

Health-Related Chemical Water Quality Exceptions							
Region/Scheme/Zone/ Service Provider	Population served	Date	Health Related Chemical Characteristic	MoU Alert Level	Remedial Action	DoH Notified	Close Out Date
Busselton	>26,000	01/10/2017 to 30/12/2017			NIL		

4.2 Chemical – Health Related

Type	Unit	ADWG 2004 Limit (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bores)			Distribution Water			
				Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value	Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value mg/L	Compliance (%)
Antimony	mg/L	0.003	0.001				4	4	ND	100%
Arsenic	mg/L	0.007	0.001				4	4	ND	100%
Barium	mg/L	0.7	0.001				4	4	0.26	100%
Beryllium	mg/L	-	0.001				4	4	ND	100%
Boron	mg/L	4.0	0.005				4	4	0.16	100%

Type	Unit	ADWG 2004 Limit (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bores)			Distribution Water			
				Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value	Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value mg/L	Compliance (%)
Bromodichloromethane	mg/L	0.25*	0.0005				3	3	ND	100%
Bromoform	mg/L	0.25*	0.0005				3	3	0.0029	100%
Cadmium	mg/L	0.002	0.0001				4	4	ND	100%
Chlorine (Total)	mg/L	5					129	129	0.90	100%
Chloroform	mg/L	0.25*	0.0005				3	3	ND	100%
Copper	mg/L	2.0	0.001				4	4	0.010	100%
Dibromochloromethane	mg/L	0.25*	0.0005				3	3	0.0011	100%
Fluoride	mg/L	1.5	0.1				21	21	0.5	100%
Lead	mg/L	0.01	0.001				4	4	ND	100%
Manganese (Soluble)	mg/L	0.5	0.005	21	21	0.091	21	21	ND	100%
Manganese (Total)	mg/L	0.5	0.005	21	21	0.091	21	21	ND	100%
Mercury	mg/L	0.001	0.00005				4	4	ND	100%
Molybdenum	mg/L	0.05	0.001				4	4	ND	100%
Nickel	mg/L	0.02	0.001				4	4	ND	100%
Nitrate	mg/L	50	0.05	7	7	0.05				
Nitrite	mg/L	3	0.005	7	7	0.011				
Selenium	mg/L	0.01	0.001				4	4	ND	100%
Silver	mg/L	0.1	0.001				4	4	ND	100%
Total Trihalomethanes	mg/L	0.25*	0.0005				3	3	0.004	100%

Type	Unit	ADWG 2004 Limit (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bores)			Distribution Water			
				Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value	Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value mg/L	Compliance (%)
Uranium	mg/L	0.02	0.001				4	4	ND	100%

Note 1 Chlorine Total is a Busselton Water in-house test. All others are accredited test results. The operating target for residual chlorine in the reticulation system is 0.4 – 0.6 mg/L. Total chlorine levels will be higher than residual levels.

Note 2 * The concentration of trihalomethanes, either individually or in total, in drinking water should not exceed 0.25 mg/L

Note 3 Busselton Water does not add fluoride to the water. The naturally occurring fluoride levels vary from bore to bore. The maximum value shown is not indicative of the level throughout the Busselton water supply. Fluoride levels in the drinking water vary with location and time and can be between 0.03 and 0.6 mg/L.

ADWG	Australian Drinking Water Guidelines
Bq/L	Becquerel per litre
CFU	colony forming units
HU	Hazen Units
mg/L	milligrams per litre
NA	Not Applicable
ND	Not Detected
NR	Not Required
NTU	Nephelometric Turbidity Units
pH	Acidity/basicity
uS/cm	Micro siemens per centimetre

5.0 Physical and Chemical – Aesthetic Performance

The results of water samples collected from the operating production bores (i.e. raw water) and at the assessable distribution sampling points (i.e. distribution water) during the fourth quarter of 2017 (October to December) are summarised in Table 5.1 for aesthetic related guidelines. The process of aeration and filtration reduces colour and iron content to below those levels specified in the Australian Drinking Water Guidelines 2004 (ADWG 2004).

5.1 Physical and Chemical - Aesthetic – Chart

Type	Unit	ADWG 2004 Limit (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bores)			Distribution Water			
				Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value	Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value (mg/L)	Compliance (%)
Alkalinity (Bicarbonate)	mg/L	-	5	7	7	210	4	4	190	100%
Alkalinity (Carbonate)	mg/L	-	5	7	7	ND	4	4	ND	100%
Alkalinity (Hydroxide)	mg/L	-	5	7	7	ND	4	4	ND	100%
Alkalinity (Total)	mg/L	-	5	7	7	180	4	4	150	100%
Aluminium (Soluble)	mg/L	0.2	0.02	7	7	ND	4	4	ND	100%
Aluminium (Total)	mg/L	0.2	0.02	7	7	ND	4	4	ND	100%
Ammonia	mg/L	0.5	0.005				4	4	ND	100%
Calcium	mg/L	-	0.2				4	4	26	100%
Chloride	mg/L	250	1	7	7	130				
Colour True	HU	15	1	21	21	3	21	21	ND	100%
Electrical Conductivity	uS/cm	-	2	21	21	750	21	21	630	100%
Filterable Reactive Phosphorus	mg/L	-	0.005	7	7	0.014				
Filterable Reactive Phosphorus as PO4	mg/L	-	0.01	7	7	0.04				
Hardness (as CaCO3)	mg/L	200	5	7	7	120	4	4	120	100%
Iron (Soluble)	mg/L	0.3	0.005	21	3	8.4	21	21	ND	100%
Iron (Total)	mg/L	0.3	0.005	21	3	8.4	21	21	0.008	100%
Magnesium	mg/L	-	0.1				4	4	14	100%
pH	pH	6.5-8.5		21	21	7.7	129	129	8.1	100%

Type	Unit	ADWG 2004 Limit (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bores)			Distribution Water			
				Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value	Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value (mg/L)	Compliance (%)
Salinity (as Total Dissolved Solids)	mg/L	500	10	21	21	400				
Silica	mg/L	-	0.05	7	7	18				
Sodium	mg/L	180	0.5	7	7	97				
Sulphate	mg/L	250	1	7	7	19				
Total Hardness by Calculation	mg/L	200	1	7	7	120	4	4	120	100%
Turbidity	NTU	5		21	21	0.52	129	129	0.22	100%
Zinc	mg/L	-	0.005				4	4	0.009	100%

Note 1 pH and Turbidity are Busselton Water in-house tests. All others are accredited test results.

ADWG	Australian Drinking Water Guidelines
Bq/L	Becquerel per litre
CFU	colony forming units
HU	Hazen Units
mg/L	milligrams per litre
NA	Not Applicable
ND	Not Detected
NR	Not Required
NTU	Nephelometric Turbidity Units
pH	Acidity/basicity
uS/cm	Micro siemens per centimetre

6.0 Radiological Performance

6.1 Radiological – Exception Notifications

Radiological Water Quality Exceptions							
Region/Scheme/Zone/ Service Provider	Population served	Date	Radiological Characteristic	MoU Alert Level	Remedial Action	DoH Notified	Close Out Date
Busselton	>26,000	01/10/2017 to 31/12/2017			Nil		

6.2 Radiological Performance

Radiological Performance is tested annually in April.

7.0 Planned Sample Summary (Quarter Ending 31 December 2017)

Region/ Scheme/ Zone	Microbiological			Physical and Chemical			Radiological			Fluoride		
	Planned	Taken	% Taken	Planned	Taken	% Taken	Planned	Taken	% Taken	Planned	Taken	% Taken
Busselton	156 (TC/E.Coli)	156	100%	957	954	99.6%	Nil	Nil	N/A	21	21	100%
	145 (TN)	145	100%									

Note 1 Chemical testing totals shown in Table 7.0 relate to scheduled NATA and in-house sampling undertaken in accordance with Busselton Water's Water Quality Monitoring Program, which has been endorsed by the Department of Health.

Note 2 During the October to December 2017 quarter, 156 microbiological samples were taken for thermotolerant coliforms and E. coli and 145 microbiological samples were taken for Thermophilic *Naegleria*. Eleven microbiological samples were not taken for Thermophilic *Naegleria* during the last week of December 2017, as advice had been received in advance from the PathWest Laboratory (subcontracted by SGS Australia to undertake analysis of this sampling for Busselton Water) that it would be closed between Christmas and New Year.

7.1 Planned Sample Exceptions

Planned Sample Exceptions			
Region/ Scheme/ Zone	Characteristic (Microbiological/ Physical and Chemical/ Radiological)	Number of Samples	Reason for missed sample
Busselton	Physical and Chemical	3	The pH meter would not calibrate. A new probe has been purchased.

8.0 General Notes / Other News

Nil