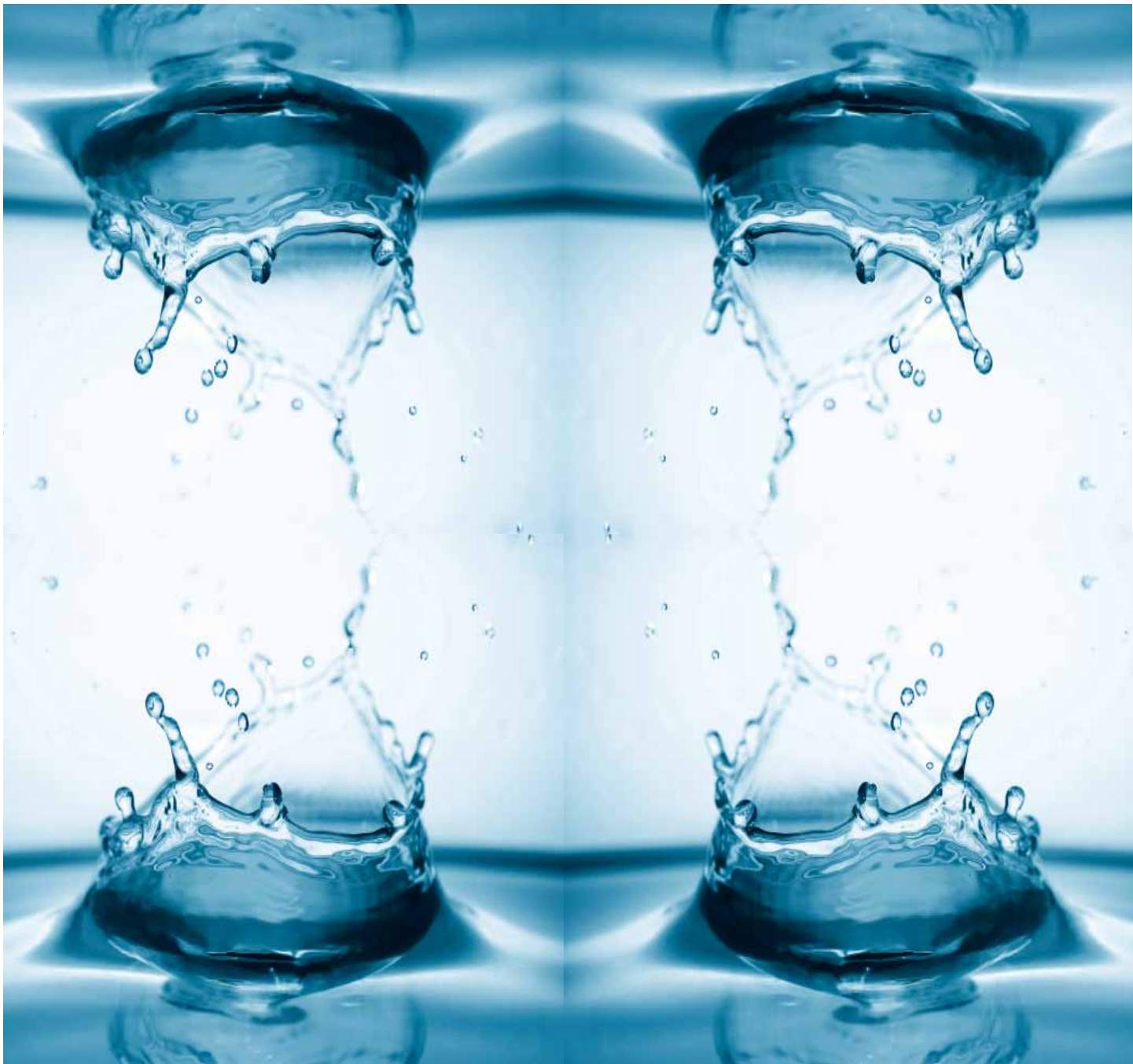
BUSSELTON WATER

2013-2014

ANNUAL WATER QUALITY REPORT



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MESSAGE FROM THE CHIEF EXECUTIVE OFFICER

I am pleased to present the 2013-14 Water Quality Report on behalf of Busselton Water.

Busselton Water's commitment to provide safe, high quality drinking water that consistently meets or exceeds the Australian Drinking Water Guidelines is firmly established and is ensured through our Memorandum of Understanding (MoU) established with the Department of Health.

Busselton Water has achieved outstanding water quality results in 2013-14 as detailed in this report and summarised in the following table.

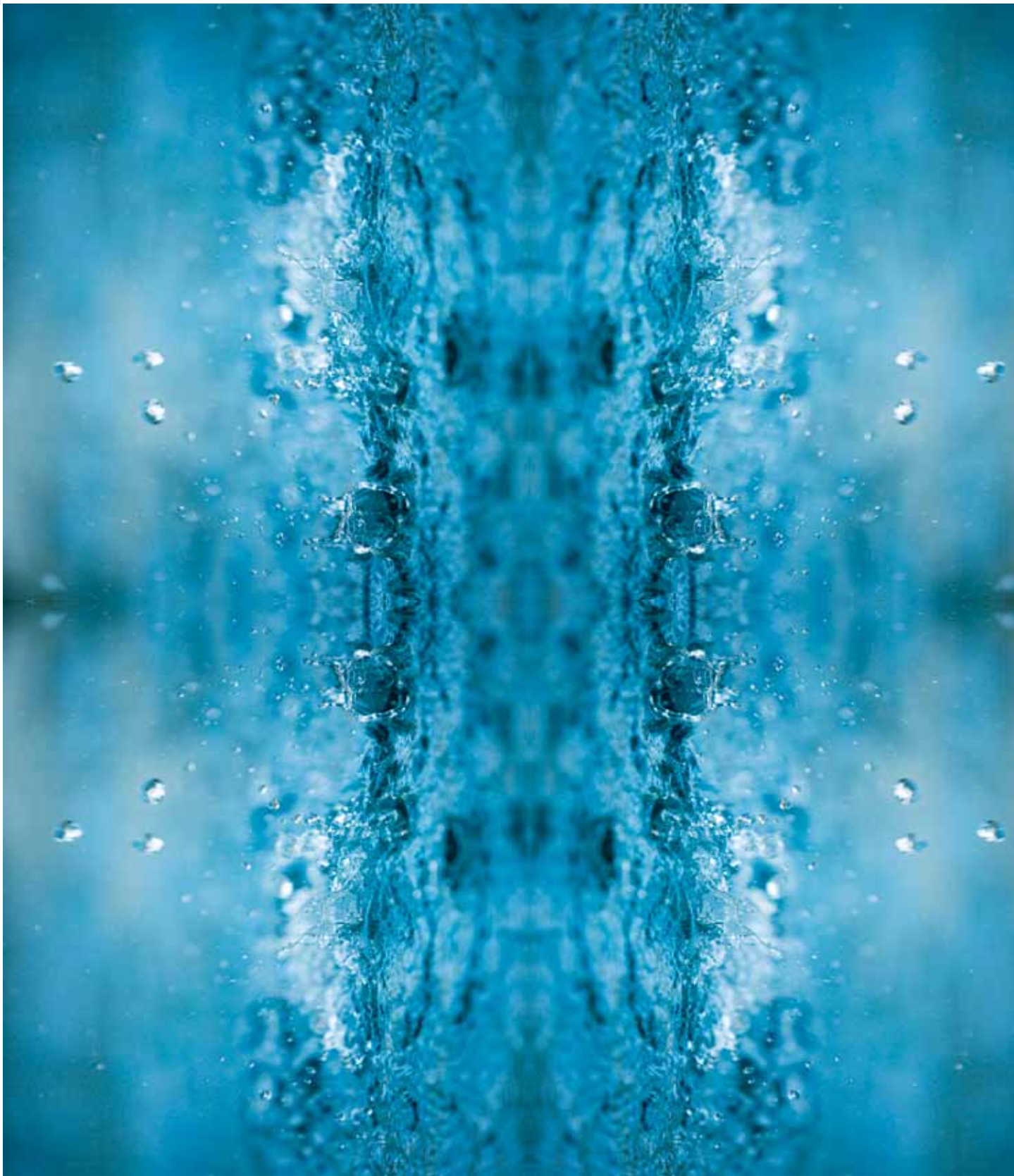
2013-14 Water Quality Results at a Glance	
Health Related Characteristics	% Compliance with MoU
Escherichia Coli	100
Naegleria	100
Chemical	100
Pesticides	100
Radiological	100
Chlorine Disinfection	100
Non Health (Aesthetic)	100

In addition to presenting water quality results and performance against the Memorandum of Understanding, this report also describes the processes Busselton Water uses to collect, treat and distribute drinking water to our customers. It also provides some insight into the customer's perception in relation to the quality of their supplied water.

I wish to thank everyone who has made a contribution to these excellent results, particularly staff and representatives from Department of Health, Hunter Water Australia and Rockwater.

Chris Elliott
Chief Executive Officer

OUR COMMITMENT



OUR COMMITMENT

Busselton Water is committed to effective management of our drinking water supplies to provide a safe, high-quality product that consistently meets the Australian Drinking Water Guidelines, consumer and other regulatory requirements.

To achieve this we will:

- Manage water quality from source water to customer.
- Use a risk-based approach to identify and manage water quality.
- Comply with health-related criteria of the Australian Drinking Water Guidelines and progressively improve the aesthetic criteria.
- Use appropriate contingency planning and incident response capability.
- Routinely monitor the quality of drinking water and use effective reporting.
- Continually improve our practise by assessing performance against corporate commitments and stakeholder expectations.
- Embrace technology to enhance our capacity at all appropriate levels.

DRINKING WATER QUALITY POLICY

Busselton Water is committed to:

Achieving 100% compliance, all of the time, with health related and non-health related water quality criteria in the Australian Drinking Water Guidelines.

In pursuit of our commitments, we will:

- Systematically monitor and report water quality performance.
- Be prepared for incidents including regular testing of our response plans.
- Fulfil all the requirements of our Operating Licence and Memorandum of Understanding with the Department of Health.

DRINKING WATER QUALITY MANAGEMENT FRAMEWORK

Busselton Water's Drinking Water Quality Management System is based on the Australian Drinking Water Guidelines (ADWG) Framework for Management of Drinking Water Quality, endorsed by the National Health and Medical Research Council. The Framework provides benchmark water quality guidelines and values for the design of a structured and systematic approach to drinking water quality management, ensuring a safe and reliable water supply.

There are 12 elements within the framework which are considered best practice. These elements are divided into four sections:

- Commitment to drinking water quality management
- System analysis and management
- Supporting requirements
- Review

Busselton Water will regularly assess its progress against implementation of the 12 elements of the Australian Drinking Water Guidelines Framework[1].

The Operating Licence issued by the Economic Regulation Authority, recognises our Memorandum of Understanding (MoU) with the Department of Health. The MoU describes the Department of Health Requirements for Compliance with the microbiological, health, chemical and radiological criteria.

Busselton Water provides the Department of Health with a quarterly water quality report, which outlines how the organisation has performed against the agreed requirements as specified in the MoU.

Busselton Water recognises and supports the ongoing work of the Advisory Committee for the Purity of Water.

Busselton Water provides raw water information to the Department of Water to ensure the long-term sustainability of the water supply for the Busselton region.

A copy of the MoU can be found on the Busselton Water website at: http://www.busseltonwater.wa.gov.au/Portals/0/Water%20quality/BW%20MOU_DoH Updated.231112.pdf

[1] The "Australian Drinking Water Guidelines" published by the National Health and Medical Research Council, Australia's peak health research body, provides an authoritative reference on what defines safe, good quality drinking water; how it can be achieved; and how it can be assured. It is available for download from www.nhmrc.gov.au/guidelines/publications.

OUR COMMITMENT

OUR LICENCE AREA

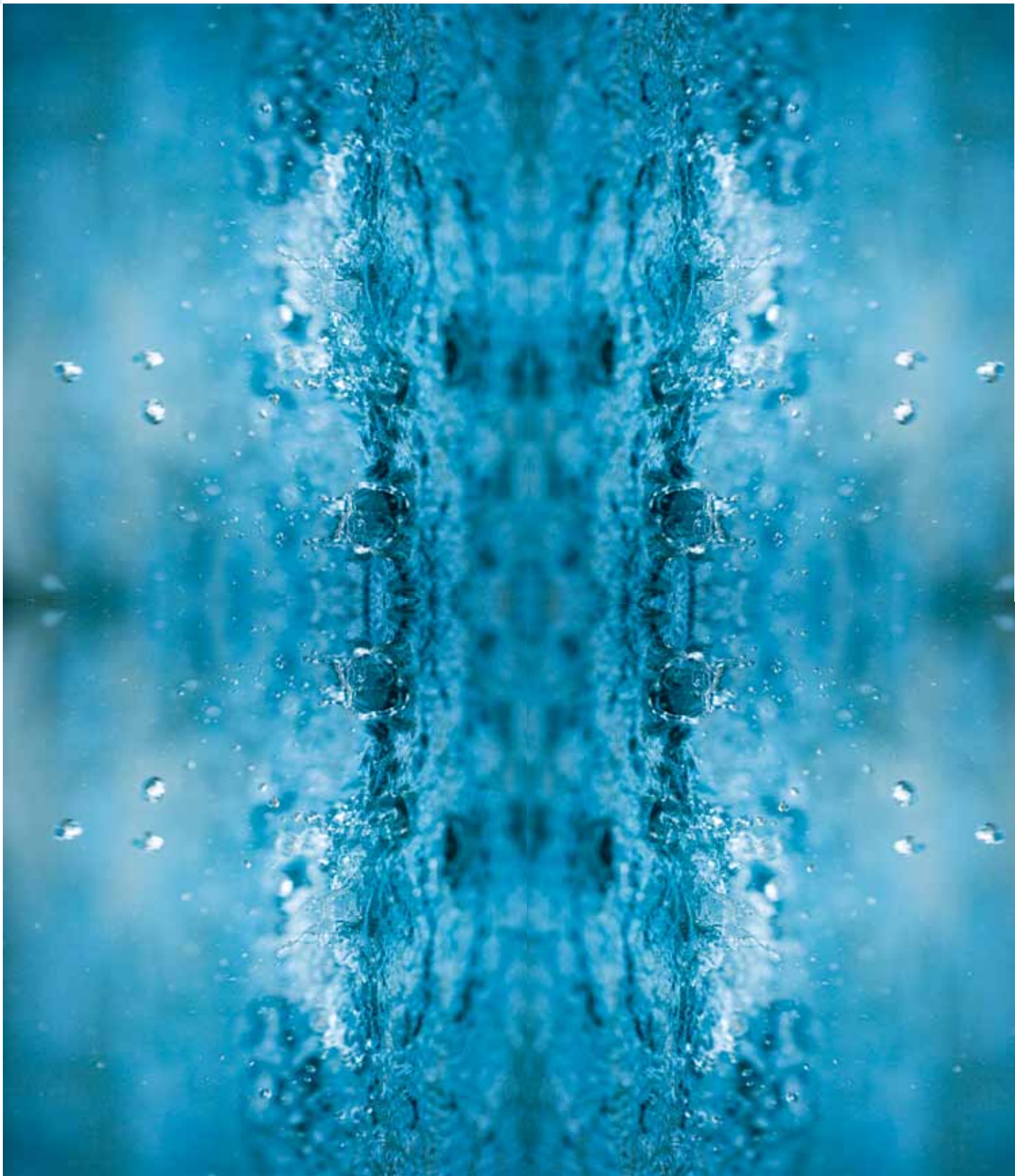
Busselton Water supplies drinking water to over 26,000 customers within the City of Busselton and close environs such as Port Geographe, Siesta Park, Vasse and Wonnerup.

As a sought-after sea-change destination, this figure can rise significantly during weekends and holiday periods.

Busselton Water also supplies bulk water to the Water Corporation for the Dunsborough Town Water Supply Scheme.

The licence area is illustrated in the Operating Licence area plan below.

SYSTEM ANALYSIS AND MANAGEMENT



OUR WATER SOURCE

Busselton Water sources water primarily from the deep Yarragadee aquifer. A small (less than 5%) amount of water is also sourced from the Leederville aquifer which extends from about 10 to 275 metres in depth. Below this the Yarragadee aquifer extends to over 800 metres in depth.

Busselton Water has an extraction licence issued by the Department of Water to extract water from the Yarragadee and Leederville aquifers. Busselton Water has eight production bores which have supplied the water that Busselton Water has produced in the last five years.

The Department of Water has created a Source Protection Plan (Report WRP 139)[2] for the Busselton Water Reserve which covers our eight bores located at Plant 1 Kent Street, Plant 3 Hobson Street, Plant 2 Queen Elizabeth Avenue and Plant 5 Queen Elizabeth Avenue.

This plan provides a risk assessment of current land use and also actions to secure and protect sources for the future.

Busselton Water uses Rockwater Pty Ltd (Hydrogeologists) to review the plan along with current groundwater results and extraction, to ensure future operational strategies are sustainable in the long term.

Financial Year	Extraction(gigalitres)
2008-2009	4.49
2009-2010	4.23
2010-2011	4.30
2011-2012	4.30
2012-2013	4.59
2013-2014	5.05

[2] http://www.water.wa.gov.au/PublicationStore/first/105861.pdf

UNDERSTANDING WATER QUALITY

Turbidity	Turbidity is the cloudy appearance of water caused by the presence of suspended matter.	The Australian Drinking Water Guidelines specify an aesthetic guideline of 5 NTU. If disinfection is required, the turbidity of less than 1 NTU is desirable at the point of disinfection.
Colour	Colour in water originates mainly from natural drainage through soil and vegetation in a catchment.	The Australian Drinking Water Guidelines value for colour is based on the colour that is noticeable in a glass. This is generally accepted as 15 HU.
Iron	Iron occurs naturally in water as a result of contact with soil or rock in the catchment. Iron in the water does not present a health hazard.	The Australian Drinking Water Guidelines recommend that based on aesthetic consideration, the concentration of Iron should not exceed 0.3 mg/L.
Manganese	Manganese in water can come from contact with soil or rock in the catchment. Manganese is not considered a health concern unless the concentration exceeds 0.5mg/L.	The Australian Drinking Water Guidelines recommend that based on aesthetic considerations, the levels of Manganese should not exceed 0.1mg/L.
Total Dissolved Solids	Total dissolved solids (TDS) consist of inorganic (natural) salts and small amounts of organic matter dissolved in water. Total dissolved solids comprise sodium, potassium, calcium, magnesium, chloride, sulphate, bicarbonate, carbonate, silicon, organic matter, fluoride, iron, manganese, nitrate and phosphate.	Treated water quality containing TDS levels of below 500mg/L is classified good.
Microbiological Pathogens and Disinfection	Thermophilic *Naegleria* refers to a group of amoeba which includes *Naegleria fowleri*, the organism that causes the waterborne disease primary amoebic meningoencephalitis. *Naegleria Fowleri* is an environmental pathogen which naturally lives in warm water. The most common and widespread health risk associated with drinking water is contamination by microorganisms. Organisms associated with the gut of humans and mammals cause the usual waterborne diseases. Tests are undertaken for *Escherichia coli* (E.Coli).	The Department of Health WA has notification protocols in place regarding *Naegleria*. The Australian Drinking Water Guidelines state that thermotolerant coliforms/*E.Coli* should not be present in a minimum 100mL sample.
Radiological	There are natural levels of radiation within the environment, and groundwater sources such as that sourced from the Yarragadee aquifer can have higher background levels than that of surface water systems.	Testing is undertaken for gross alpha and gross beta radioactivity, following which Radium 226 and Radium 228 can be determined. The Australian Drinking Water Guidelines 2004 recommend that levels should not exceed 0.5 Bq/L.
pH	pH is the measure of the hydrogen ion concentration of water. pH is not measured in any units.	The suggested aesthetic pH target from the Australian Drinking Water Guidelines is 6.5 to 8.5.

WATER TREATMENT

Busselton Water uses a three step process to treat the raw water from the deep groundwater aquifers to produce safe drinking water to its customers.

Aeration and Pre-treatment

Raw water is aerated via spray aerators, which oxidise naturally occuring iron, turning it from soluble into small solids.

Filtration

The aerated water is then filtered through a sand filter to remove iron, turbidity and impurities. The filtered water is then collected in a clear well.

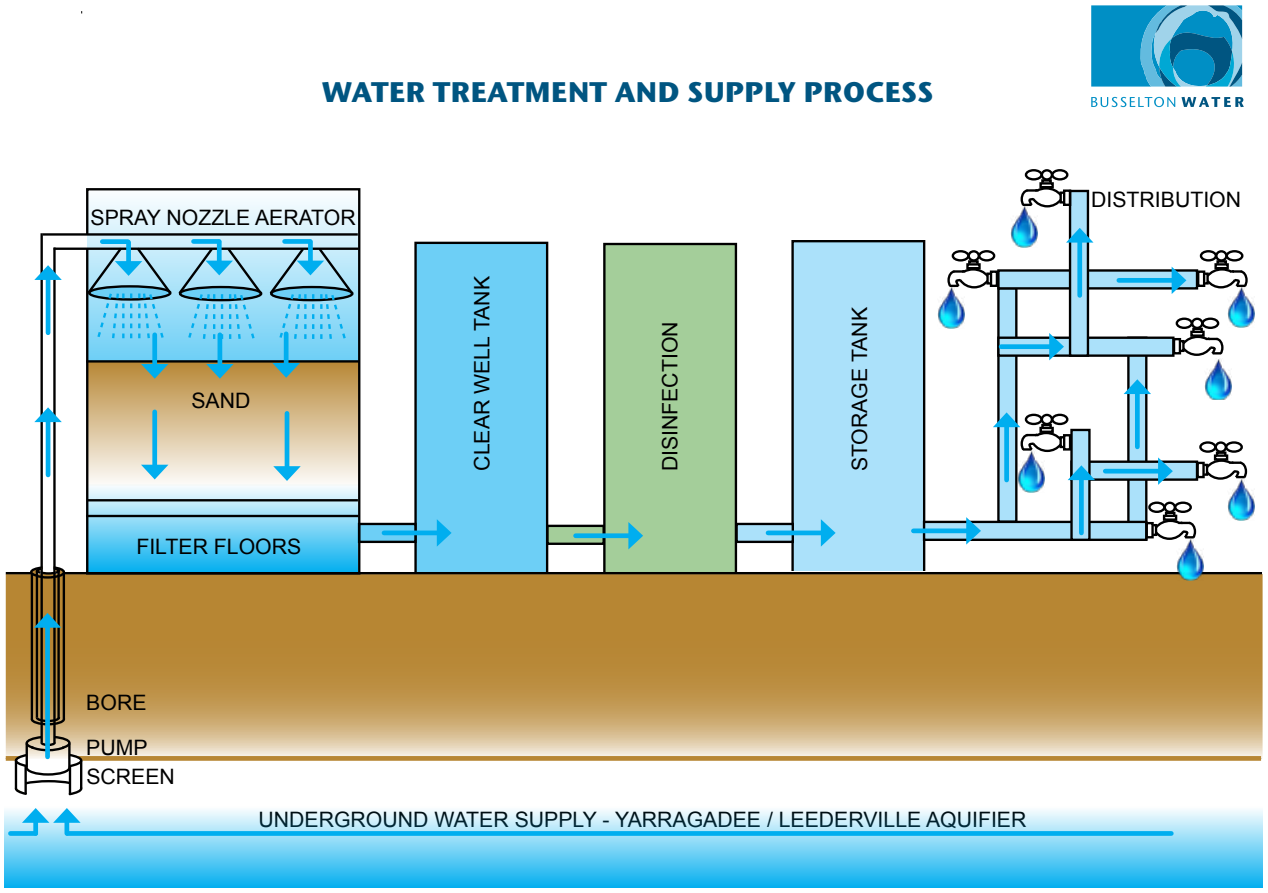
Disinfection

Chlorine is added to maintain the disinfection level required to preserve microbiological safety before it is pumped into the distribution system.

OUR WATER TREATMENT PLANTS

Busselton Water has three treatment plants:

- Plant 1 – Kent Street, Busselton
- Plant 2 – Queen Elizabeth Avenue, Busselton
- Plant 3 – Hobson Street, East Busselton



DISTRIBUTION NETWORK

Busselton Water's distribution network delivers drinking water within the City of Busselton and close environs. The network operates as one large, interconnected system. The materials used in the reticulation network have been approved either under Australian Standard AS/NZS 4020: 2005 - (testing of procedures for use in contact with drinking water) or as scheduled in our Memorandum of Understanding with the Department of Health.

Strict protocols have been established by Busselton Water to assure the purity of the chlorine used and the safe handling of chlorine at the Treatment Plants.

The distribution network has the following components:

Estimated Population	Approximately 26,000
Total Number of Connections	12,040
Total Length of Pipes	306 km
Number of Storage Tanks	5
Chlorine Residual Target	0.5 mg/L
Number of Distribution Water Quality Zones	1

MULTI BARRIER APPROACH

Preventing contamination and minimising potential hazards is an essential part of providing our customers with safe drinking water. The Australian Drinking Water Guidelines (2004) state that a multi barrier approach is the most effective to ensure the safety of drinking water.

Barriers include:

- Protection of Groundwater
- Treatment
- Chlorine disinfection
- Backflow Prevention

Busselton Water maintains and operates these multiple barriers, ensuring they are robust and that high quality water is delivered to its customers.

INCIDENT RESPONSES

While every effort is made to prevent water quality incidents from occurring, there will inevitably be times when things go wrong due to equipment failure, human error, extreme weather conditions or unforseen events. Busselton Water has incident response plans to manage such events with the minimum possible impact on water quality.

In the event of a water quality incident, Busselton Water activates its Incident Response Plan, which is a comprehensive plan to handle water quality events and links to the binding protocols of the MoU between Busselton Water and the Department of Health.

In maintenance of our preparedness to deal with any water quality incidents or events, and as part of our compliance with the MoU with the Department of Health, a mock event simulating a failure of our systems is conducted annually. This year the event was held in January 2014 and simulated a water quality failure that resulted from damage to our distribution network from a severe weather event.

During the reporting period there were no incidents that required notification to the Department of Health.

WATER QUALITY PERFORMANCE

Water Quality Monitoring and Testing

Busselton Water has a comprehensive monitoring program which has been reviewed and endorsed by the Department of Health.

Key parameters monitored by Busselton Water include:

- Microbiological – this includes Thermophilic *Naegleria* and *Escherichia coli*.
- Chemical Health – this includes a large range of parameters with health related guideline values in the ADWG (2004).
- Chemical Non-Health (Aesthetic) – this includes a large range of parameters with Non-Health guideline values in the ADWG (2004).
- Radiological Health – monitoring and testing carried out on an annual basis.

SYSTEM ANALYSIS AND MANAGEMENT

Development, Training and Innovation

Busselton Water utilises training in accordance with the National Water Industry Training package. Water Quality operational staff now possess Certificate III in Water Industry Operations.

Staff regularly attend relevant training courses and/or conferences, such as the Australian Water Association – OzWater and the Water Industry Engineers and Operators Annual Conference.

Our Customers

We strive to deliver excellence in customer service and continue to improve our existing levels of customer satisfaction. Each year an independent survey is undertaken to assist with that improvement, along with a robust complaints handling process that has achieved exemplary audit results.

This year 29 water quality complaints were received, a decrease of 87% compared to the previous year. Of the complaints received 62% related to discoloured water with the remaining related to taste and odour.

Customer perceptions of water quality are measured in our annual survey. This year's survey was undertaken about two years after the introduction of a new disinfection system. The first twelve months for the new system indicated a general decline in satisfaction prompting further action in the area of education and stakeholder engagement. Since then the dissatisfaction levels have declined back towards the historically low levels, as evidenced by the reduction in water quality complaints.

Microbiological and Disinfection Health Results

Busselton Water collected a total of 728 samples from the reticulation system during the reporting period and 100 per cent of these results were compliant with no detections of either *Escherichia coli* or Thermophilic *Naegleria*. A further 884 samples were taken for chlorine levels.

Chemical Health Results

There are a large number of chemical parameters that have health-related guideline values in the Australian Drinking Water Guidelines 2004. The detailed report in the next section gives more detail on the individual parameters. Busselton Water achieved 100 per cent compliance with all the health-related requirements set out in the Australian Drinking Water Guidelines 2004 for chemical parameters.

Radiological Health Results

Groundwater radiological testing is carried out in accordance with parameters and frequencies based on the Australian Drinking Water Guidelines 2004 and in consultation with the Department of Health.

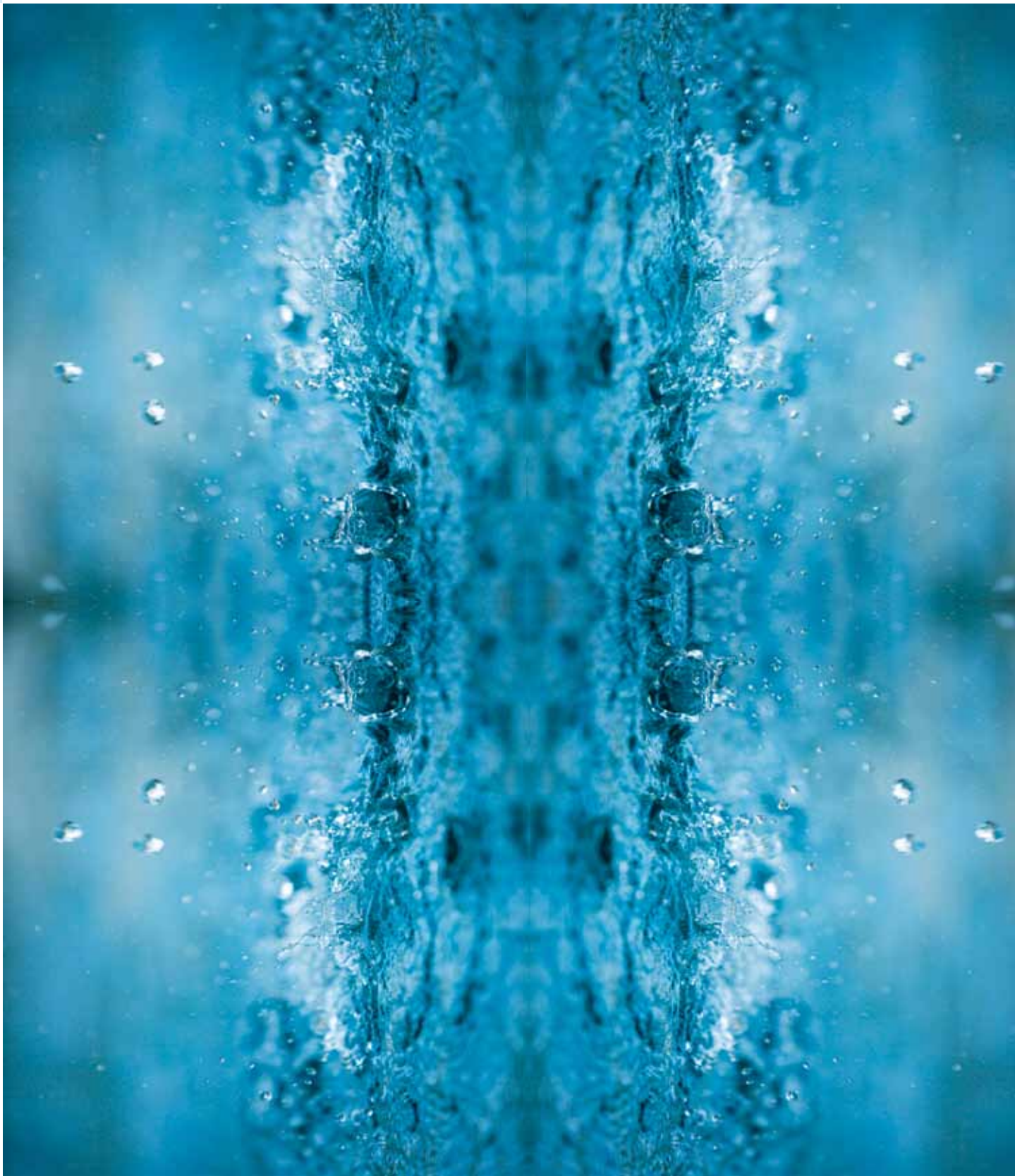
Graduates radiological testing is only required periodically. In April 2014, tests were undertaken for Gross Alpha, Gross Beta, Radium 226 and Radium 228 and results from these samples were 100 per cent compliant.

Non-Health (Aesthetic) Results

There are a large number of parameters with aesthetic guideline value in the Australian Drinking Water Guidelines parameters. The detailed report in the next section gives more detail on the individual parameters. Busselton Water achieved 100 % compliance except for chlorine in the distribution system.

Free chlorine concentrations exceeded aesthetic limits in some locations, however the Australian Drinking Water Guidelines 2004 state that "In some supplies it may be necessary to exceed the aesthetic guideline in order to maintain an effective residual throughout the system." Free chlorine concentrations in the distribution system have been optimised so that the target residual at the end of the network is achieved.

WATER QUALITY RESULTS



WATER QUALITY RESULTS

Memorandum of Understanding – Drinking Water Quality Report

HEALTH – 1 July 2013 to 30 June 2014

CHARACTERISTIC	UNIT	ADWG (Health)	Non-Compliance (Health)	No. Samples	% Compliance (Health)	Max. Value
CHEMICAL						
Carbon Tetrachloride	mg/L	0.003	0	5	100	ND
Chlorine (Total)	mg/L	5	0	884	100	0.92
Fluoride	mg/L	1.5	0	84	100	0.7
Antimony	mg/L	0.003	0	4	100	ND
Cadmium	mg/L	0.002	0	4	100	ND
Chromium	mg/L	0.05	0	4	100	ND
Copper	mg/L	2	0	84	100	0.018
Lead	mg/L	0.01	0	4	100	ND
Manganese (Total)	mg/L	0.5	0	84	100	0.11
Nickel	mg/L	0.02	0	1	100	ND
Nitrate	mg/L	0.25	0	48	100	0.005
Nitrite	mg/L	3.0	0	14	100	<0.05
Total Trihalomethanes	mg/L	0.25	0	82	100	0.008
RADIOLOGICAL						
Radium 226	Bq/L	0.5	0	8	100	0.071+-0.029
Radium 228	Bq/L	0.5	0	8	100	0.150+-0.039
MICROBIOLOGICAL						
Escherichia coli	CFU/100mL	0	0	371	100	ND
Thermophilic *Naegleria*	org/250mL	ND	0	371	100	ND
Naegleria fowleri	org/250mL	ND	0	0	100	ND

WATER QUALITY RESULTS

Memorandum of Understanding – Drinking Water Quality Report

NON HEALTH (AESTHETIC)– 1 July 2013 to 30 June 2014

CHARACTERISTIC	UNIT	ADWG (Aesthetic)	Non-Compliance (Aesthetic)	No. Samples	% Compliance (Aesthetic)	Max. Value
CHEMICAL and PHYSICAL						
Colour (True)	HU	15	0	84	100	ND
Colour (Apparent)	HU	15	0	84	100	4
Hardness	mg/L	200	0	84	100	130
Iron (Total)	mg/L	0.3	0	84	100	0.047
Ammonia	mg/L	0.5	0	84	100	ND
Copper	mg/L	1	0	84	100	0.018
Hydrogen Sulphide	mg/L	0.05	0	4	100	ND
Manganese (Total)	mg/L	0.1	0	84	100	ND
pH	pH	6.5-8.5	0	884	100	8.4
Turbidity	NTU	5	0	1173	100	2.27
Zinc	mg/L	3	0	4	100	0.018

mg/L - Milligrams per litre

ND - Not Detected

NTU - Nephelometric turbidity units

NA - Not Applicable

Bq/L - Becquerel per litre

Busselton Water collected 1768 free chlorine and total chlorine samples in the distribution network during 2013-14. The minimum, average and maximum levels are:

Type	Minimum mg/L	Average mg/L	Maximum mg/L
Distributed Chlorine (Free)	0.46	0.64	0.87
Distributed Chlorine (Total)	0.37	0.66	0.92

When chlorine is added to water it reacts with chemical components and biological lifeforms.
The remaining chlorine left over after those reactions is called 'free' chlorine as it is 'free' to disinfect.
The 'total' chlorine levels provide the amount of chlorine that has reacted and also the remaining free chlorine.

For further information please contact Busselton Water at the address below.

BUSSELTON WATER

BUSSELTON WATER
PO Box 57
Busselton WA 6280
P: 089781 0500
F: 089754 1075

admin@busseltonwater.wa.gov.au
www.busseltonwater.wa.gov.au