



**BUSSELTON WATER**

supplying



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Our ref : WP41  
Your ref :  
Enquiries :

17<sup>th</sup> October, 2012

Hon Brian Ellis MLC  
Chairman  
Standing Committee on Environment and Public Affairs  
Parliament House  
PERTH WA 6000

Dear Sir,

**Re: Petition No. 166 – Cessation of Chlorination of Busselton Water Supply**

I refer to the Committee's request for comment on the terms of Petition No. 166 – thank you for the opportunity to respond on behalf of Busselton Water.

Busselton Water is committed to supplying our growing city with safe, high quality water. It's important to recognise that Busselton was the last major Australian water supply to chlorinate.

Busselton Water's Board took the decision to chlorinate in order to provide residents and visitors with the safest possible drinking water at all times. In doing so, Busselton Water is meeting the requirements of the National Medical Research and Health Council (NMRHC), which sets the Australian Drinking Water Guidelines (ADWG) under which water suppliers operate.

Busselton Water's decision to chlorinate the water supply has the strong support of the Department of Health and Department of Water. The decision was taken after extensive research by experienced and well regarded consultants, Hunter Water Australia, which recommended a residual chlorination system as the most effective means of providing a safe water supply.

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The key issue in opting for chlorination has been Busselton's growth, and the resulting growth and complexity of the city's network of water supply pipelines. This growth has exposed the city's water supply system to greater risk of contamination.

The historical layout of Busselton was a thin coastal strip and water travelled a short distance through pipelines to taps. Ultraviolet (UV) disinfection was viable because water remained in the pipelines for a short time after treatment and the risk of contamination was low.

However, Busselton is now a city. Busselton Water is supplying more than 11,000 properties – most of them homes – and our pipeline now stretches more than 300 kilometres to deliver water to new suburbs. This expansion means water can sit in the pipelines for many hours or days, exposing it to greater risk of contamination.

Although the water is high quality because it is drawn from the Yarragadee and Leederville aquifers, where it is protected against contamination, it is exposed once it enters the pipeline. This risk is heightened by the warmth of the water drawn from the aquifers.

Independent testing has detected the persistent presence of the *Naegleria lovaniensis* amoeba in the Busselton pipeline network. *Naegleria lovaniensis* is not harmful but its presence indicates that conditions are suitable for *Naegleria fowleri*. In rare cases, *Naegleria fowleri* causes the waterborne disease primary amoebic meningoencephalitis (PAM), which has been attributed to the deaths of children in WA.

Once it finds its way into a water system, *Naegleria* is very difficult to eradicate. It remained in Busselton's pipelines despite persistent flushing and spot chlorination by portable chlorinator units.

The detection of *Naegleria* in the pipeline network demonstrated that UV technology was not protecting the water supply against contamination within the pipeline network. *Naegleria* was not considered when the UV system was implemented in 2001.

Busselton's growth and projections for further growth meant that chlorination was the only safe option to provide protection against contamination of our water by dangerous bacteria, viruses and some protozoa, which can spread infection and disease.

Chlorine has protected water supplies in Australia and around the world for over 100 years – safely and effectively.

Busselton Water is chlorinating at a fraction of the maximum recommended limits endorsed by the NMRHC's ADWG guidelines and the World Health Organisation. Both recommend a maximum of 5 milligrams of chlorine per litre of water (5mg/L) - Busselton Water is adding less than 1 milligram per litre at its treatment plants – less than one part chlorine for every million parts of water.

None-the-less, Busselton Water continues to work with the Department of Health and others to achieve a safe, low level of chlorine, and ensure the water is safe from contamination. This involves constant monitoring and regulation to achieve the optimum balance between a safe water supply, while limiting the impact on taste and odour.

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Busselton Water is proud that in more than a century of operation Busselton hasn't experienced a major health issue because of contaminated water – and it's a record we're determined to maintain in order to protect more than 20,000 people who live in Busselton, as well as the tens of thousands who enjoy the city every year as a holiday destination.

Busselton Water would like to provide specific comment on the issues raised by the Committee as follows:

1. *Petitioners claim numerous health problems since chlorination including asthma, skin allergies and rashes, mouth ulcers, sore throats and eyes, headaches and a greater risk of cancer. Petitioners also claim that pets have become sick.*

- *How many health complaints has Busselton Water received from residents since chlorination?*

Busselton Water has recorded 27 complaints of health related issues between 18 April, when chlorination was implemented, and September 1. These were of a broad and general nature. Busselton Water provided a summary of complaints to the Department of Health.

- *Have these complaints been investigated, and if so, what was the outcome of those investigations?*
- *Has Busselton Water referred the residents' health complaints to any other agency for investigation?*

Busselton Water has treated all health complaints with concern. All people registering health complaints have been advised to seek medical advice from a health professional and to contact the Department of Health with concerns relating to the chlorination of Busselton's water supply. In addition, Busselton Water provided the Department of Health with a summary of the complaints.

Busselton Water regularly tests chlorine levels and tests the water to ensure it is safe to drink and complies at all times with the Australian Drinking Water Guidelines set by the National Medical Research and Health Council. Our testing shows that the water is well within health guideline limits at all times.

In addition, the Department of Health will continue to closely monitor the introduction of chlorination to Busselton, to ensure that public health is protected at all times.

The Department of Health has advised that it will investigate any case referred to it by doctors with clinical grounds on why it is reasonable to consider chlorination of the Busselton water supply as a factor in the development of the health effects experienced by the patient concerned.

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2. *Petitioners claim that the chemistry of Busselton water is unique (very alkaline) and chlorination of such water does not produce a safer product (see the submission by Wendy Slee enclosed). Please comment.*

Throughout Australia raw water supplies have large variations in water chemistry, including pH, and these can be effectively managed within water treatment processes.

The average pH at Busselton Water's treatment plants is ~ 8.1–8.3 before chlorination, and this was taken into consideration when considering chlorination options. The addition of chlorine in the treatment process was reviewed and modelled, as a result chlorine gas was found to provide benefit to the water chemistry as it aids in reducing the pH to be more in line with the Australian Drinking Water Guideline levels that range between 6.5 - 8.5.

Further, disinfection is not just about chlorine concentration but also the time the water/pathogen is exposed to the chlorine. Disinfection capacity is calculated by using a value called Ct (Contact time). For example, for a high concentration of chlorine you can have a shorter exposure time, but you can get the same end result if you had a lower chlorine concentration for a longer exposure time. Most pathogens have been tested to determine the required Ct at different pH values and this includes *Naegleria fowleri*. Results have been compared to Busselton Water's treatment capacity and it has been found that with current operations and water pH the disinfection rates are sufficient.

Therefore the current chlorine dosing regime is providing a 'safer product'.

3. *Petitioners claim that the water is badly discoloured. Please comment.*

Busselton Water has a proud track record of supplying high quality water and regrets any inconvenience caused by discolouration. However, discoloured water is not uncommon when chlorinating a previously non-chlorinated water supply and can and does also occur for a number of other reasons in every water system.

In implementing chlorination, Busselton Water conducted an extensive flushing program to move the chlorine residual through the network as quickly as possible. The flushing program dislodged sediment build-up within the pipeline network, causing discolouration. The discolouration caused by this process is regrettable but the result of an essential step in ensuring Busselton's water supply is safe. Much of the discoloured water was purged from the network with the flushing program on the implementation of chlorination. As anticipated by Busselton Water, the majority of complaints about discoloured water were received in this period. Busselton Water received 79 discolouration complaints in April/May. The incidence of discolouration has declined as this water is continually flushed from the network. In September, 16 discoloured water complaints were lodged with Busselton Water.

It should be noted that Busselton Water advised customers and residents of the potential for discolouration in the lead-up to the implementation of chlorination. This advice was contained in a 'Notification of Change to Water Supply' newsletter, distributed to all customers and residents one month prior to chlorination.

It should also be noted that discolouration can be caused by corrosion of a customer's internal household piping.

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4. *How is the drinking water tested for safety? Please outline the testing process including how the testing is done, where within the system the water is tested (at outlets?), and how often testing is conducted.*

Busselton Water conducts microbiological and chemical testing in weekly, monthly, quarterly and annual cycles.

Testing is conducted to a standard depending on its nature (i.e. if it's a microbiological sample, the tap spigot is firstly sterilised with a flame torch to eliminate contamination from the tap).

Testing is carried out at 8 production bores, 5 treated storage sites and up to 15 points in the network, all depending on the test performed.

Testing is carried out in accordance with the requirements of the Memorandum of Understanding with the Department of Health and all systems and results are monitored by that Department.

5. *Is the water tested for taste and colour?*

There is no prescribed test that can be done for taste. Colour is tested in two forms (true and apparent) at 8 bores, and 7 distribution sites on a monthly basis.

However, Busselton Water is constantly monitoring and regulating the chlorine level in order to achieve the optimum balance between a safe water supply, while limiting the impact on taste and odour.

6. *Since chlorination, have the test results been satisfactory in terms of effective disinfection and safety for consumers?*

Yes. All testing has demonstrated effective disinfection and safe water quality since the implementation of chlorination. Extensive microbiological testing has not returned a positive indicator in the reticulation supply that are assessable or notifiable to the Department of Health.

*Have the test results identified a possible cause of the petitioners' complaints?*

No.

7. *Petitioners claim that water from outlets close to the pumping station (including some schools) has a very strong smell and taste of chlorine and is undrinkable. Has Busselton Water conducted tests on the water at these outlets? If so, what were the results?*

Busselton Water is constantly monitoring and regulating the chlorine level in order to achieve the optimum balance between a safe water supply, while limiting the impact on taste and odour.

Busselton Water is adding 0.8 milligrams of chlorine per litre of water at treatment plants – this is significantly lower than the maximum threshold set by the National Medical

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Research and Health Council's Australian Drinking Water Guidelines. It is worth noting that 0.8 milligrams per litre represents less than one part chlorine per million parts water.

Busselton Water conducts chlorine testing at 5 storage tanks and 15 distribution sites on a weekly basis. It also conducts verification and validation of the dosing facilities three times per week. Further to this, continuous monitoring by the PLC that controls the facilities has in built interlocks and alarms which stop/start, alarm/shutdown the entire operation should an analyser or chlorinator (or any control component) drift from nominal set points.

The Australian Drinking Water Guidelines specifies a maximum threshold of chlorine at 5.0mg/L. BW's set point for chlorine is 1.0 - 0.8mg/L. Neither one of these specifications have been exceeded.

**Additional Information:**

1. Following the Board's decision to chlorinate the water supply Busselton Water received a letter from the Department of Health (DoH) that 'requires' chlorination or a residual system. The following is an excerpt from the Department of Health's letter that will provide some background and context.

*"The growth of Busselton has now changed the water distribution system. It is now likely that water will be held in distribution mains for extended periods of time and in some areas it is possible for water to circulate around the network. As growth continues the increased complexity of the distribution system will place additional pressure on the integrity and 'safety' of your community's drinking water supply."*

*"The Department of Health supports and requires the use of chlorine or an equivalent residual drinking water disinfection in all complex drinking water distribution systems. Alternative disinfectants such as ozone and ultra violet light do not provide an ongoing protection from possible recontamination after treatment."*

Further data provided by the DoH states "that episodes of dermatitis have also been associated with exposure to chlorine. However, the general population is not expected to spontaneously develop dermal allergies to the low levels of chlorine in drinking water. No adverse dermal effects from exposure to chlorine in swimming pools (where it is used in higher concentrations than the residual chlorine proposed 1 to 3 mg/L) have been reported. It has been reported that asthma can be triggered by exposure to chlorinated water however, under normal chlorine concentrations in Busselton's water and during normal conditions of use, the inhalation of mists or vapours from dilute chlorine solutions is not expected to cause any adverse health effects."

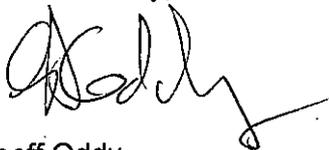
Busselton Water takes great pride in its role in the Busselton community. It has managed the provision of high quality, safe water through changing times, dating back to 1906. It is of deep concern to Busselton Water that members of its Board, staff, and on some occasions their partners, have been subjected to abuse and threats of violence. Busselton Water staff members have been verbally abused as they perform their duties in providing an essential community service. In one particularly disturbing incident, a vehicle was driven towards a staff member in a threatening manner. Our staff members have been verbally abused while off-duty, as they carried out normal personal activities. One community member who publically supported chlorination had threats of violence

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directed at them and their family. These actions are to be deplored. As members of the community, Busselton Water's Board and staff members are committed to providing the residents of Busselton with a high quality water supply. Busselton Water has endeavoured at all times to inform the community of the issues relating to chlorination and provide answers to reasoned argument. It has committed significant amounts of time, resources and expense to provide factual and accurate information on all issues raised whether or not they are soundly based. Busselton Water did not take the decision to chlorinate lightly. The Board gave the issue a great deal of consideration, taking into account the latest scientific research and community concerns, and concluded that chlorination was the only option for ensuring a safe water supply for a growing city. The detection of Naegleria within Busselton's pipelines showed that UV was not providing adequate disinfection to reduce the risk to the community.

Busselton Water is committed to working with the community, the Department of Health and others to ensure that it delivers the best and safest water supply possible.

Yours faithfully,



Geoff Oddy  
**Acting Chief Executive Officer**

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