
Awatere Water Supply

Proposed Water Treatment



A Very Brief History

Ten years ago the majority of the public did not see a need for treatment of the Awatere water, however this is changing. There is also increasing pressure from Central Government and District Health Boards to make drinking water safe for everyone across the country.

In 2008 Council proposed a water treatment plant, costing \$6.2 million, to meet new Government legislation. Council offered a \$2 million subsidy and Government approved a \$2.24 million grant, leaving ratepayers \$2 million to pay.

Residents rejected this proposal in 2008 because the costs were too high, and in 2009 access to the Government subsidy expired. Revised criteria for drinking-water subsidies have just been released, and Council are currently assessing the implications of the new criteria for Seddon and the Awatere water supply.

Subject to Council approval, funding from infrastructural reserves may be available as a 50% subsidy on any Awatere water supply scheme that is working towards full compliance with the Drinking-water Standards for NZ.

Currently Government requires drinking water supplies serving populations the size of the Awatere to comply with the Drinking-water Standards for NZ from July 2014. Government are currently reviewing these standards.

Significant research into lower cost options has been carried out by the Awatere Settlers Association Water Sub-committee, and by Council. As part of their research the Water Sub-committee visited Cheviot where Hurunui District Council (HDC) have installed a MIOX treatment plant.

The Sub-committee decided MIOX was an appropriate solution for Awatere. Council then carried out investigation, design and pricing. A proposal for MIOX treatment was presented to the community at the Public Meeting on 16 Nov 2010. Some discussion was also held about Point of Entry treatment, and the Cheviot experience with MIOX. This flyer summarises MIOX and Point of Entry treatment, including indicative costs of each scheme.

The Primary Health Issues

Regular sampling over many years has consistently shown evidence of contamination by E. coli in the Awatere water supply. Giardia and Cryptosporidium (protozoa) and, most seriously, E. coli O157 have also been found.

E. coli is a bacteria indicating contamination by faecal matter from animals or humans.

E. coli and protozoa can cause a range of health issues from minor stomach upsets through to more severe illnesses, especially in the young, elderly or infirm, and in out-of-area visitors; while E. coli O157 can cause kidney complications in a small number of affected people. In addition, outbreaks affecting large numbers of people can occur - Walkerton, Canada, experienced a tragic problem in May 2000, and in 1984 3,500 people were affected in Queenstown, NZ.

Other than boiling the water, the steps for making the water safe to drink include:

- Cleaning up the catchment
- Filtering the water
- Disinfecting the water
- Stopping backflow

It is not practicable to clean the catchment, i.e. eliminate or exclude all animals and humans from the catchment, so the water must be boiled or treated.

What Is Compliance?

When compliance with the Drinking-water Standards for NZ is referred to it means more than just 'no bugs in the water'. There are many requirements to comply with and these include factors such as:

- Microbial - bacteria, protozoa, viruses
- Inorganics - eg; arsenic, cyanide, mercury
- Organics - eg; pesticides, benzene, toluene
- Aesthetics - eg; taste, odour, appearance
- Operations - eg; equipment, processes

Compliance with the Standards is measured by showing how a treatment plant or network meets the requirements, through sampling and monitoring for a 12 month period.

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What is MIOX?

MIOX is a brand of sodium hypochlorite generator. It works by passing an electric current through salt water to produce a range of oxidants including free chlorine, which is used to disinfect water supplies. The salt used in this process will come from the Lake Grassmere saltworks, and be combined with the Black Birch raw water.

The mixed oxidant solution created by this process is then injected into the water main to disinfect the whole of the Awatere Water Supply network.

The introduction of MIOX will reduce the risk of illness by inactivating *E. coli* and other bacteria when the water in the Black Birch catchment is clear. Based on the Cheviot experience, the use of MIOX may allow the permanent Boil Water Notice to be lifted.

When the Black Birch water is dirty (in flood) the MIOX system may be ineffective. During these periods it may be necessary to issue a Boil Water Notice for the duration of the event. This is estimated to occur two to four times a year.

MIOX is preferred because it is currently the most economic step toward compliance - for a lower cost than full treatment it provides safer water than is currently available. While MIOX treatment will not be fully compliant with Government regulations it can be used as the disinfection stage of future full treatment (currently required by July 2014), so money spent now on MIOX will not be 'wasted'.

Operation and maintenance of the MIOX system will be carried out by Council staff and contractors.

The Cheviot Experience

Cheviot is a small community in the Hurunui District that had a permanent Boil Water from 2004 to 2009, and no simple treatment option.

In April 2009 HDC were issued a directive from the District Health Board (DHB) that if the Cheviot water was not treated by 1 July 2009 drinking water must be tankered in. They were also advised applications for future liquor and restaurant licenses may be withheld if premises were serving un-treated water.

With a three month time-limit to resolve the issue, a MIOX system was chosen as the most effective, least offensive and most affordable solution for the situation. The MIOX plant was commissioned July 2009. Since the plant came online there have been no *E. coli* detected, even in times of high turbidity. Testing for *E. coli* changed from monthly to weekly, and the Boil Water Notice was lifted after one month.

Point of Entry Treatment (UV for households)

Point of Entry Treatment (PoE) was discussed at the Public Meeting as a possible alternative to MIOX.

PoE involves the installation of a filtration and sterilisation system at the point of entry to where drinking water is used, eg; at a domestic residence.

The UV sterilisation inactivates bacteria and viruses, and filtering removes protozoa. Filtering may also address taste, odour and appearance, dependant on the type of filter. Filtration is essential to ensure best possible performance of the UV.

Not all UV units are the same, as indicated in the general descriptions below:

- Low End - measure UV intensity, have no auto-shutoff valve, require manual restart after an alarm
- Mid-Range - measure UV intensity, have an auto-shutoff valve, require manual restart after an alarm
- Top End - measure UV intensity and turbidity, have auto-shutoff valves, restart themselves if an alarm condition returns to normal

Note that units that alarm only on UV intensity may be indicating a dirty sensor or low water quality.

The more expensive units have more functions which provide a greater certainty of water quality, more acceptable to the DHB.

Each PoE unit will require electricity, plumbing and suitable housing, as well as ongoing maintenance. It is expected that compliance with the proposed standards will require Council to undertake much of the maintenance, including:

- UV lamp replacement - annually
- Filter cartridge replacement - 6 monthly
- Response to alarms - as required
- Cleaning of sensor or lamp sleeve - as required

The standard UV unit lifespan is 10 years, meaning that every 10 years the entire UV unit will require replacement.

For reference, a typical year of operation of the Seddon School UV unit includes approximately 10-12 alarms; and the UV unit has just been replaced after 10 years operation, due to failure.

The Government have yet to finalise the standards for PoE treatment, so any PoE units installed prior to this may not be compliant with the finalised standards. Should the standards be enforced any non-compliant unit may need to be replaced.

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The Comparison

	Current Situation	Full Treatment	MIOX Treatment (Preferred Treatment)	Point of Entry Treatment (Possible Alternative Treatment)
Description	Untreated	Full supply filtration with chlorination or UV	Single point of treatment for whole network	UV treatment at point of entry to domestic use, based on 500 households
Issues:				
Kills E. coli	No	Yes	Yes	Yes
Kills Protozoa	No	Yes	No	Only with correct filtration at each property
Compliance with Government requirements	No	Yes	No	Standards are yet to be finalised by Government
Boil Water Notice may be removed	No	Yes	Maybe, if testing proves absence of E. coli (at discretion of the DHB)	At the discretion of the DHB. May require random testing of household water supplies.
Can be used as part of future full treatment	N/A	N/A	Yes	Currently, no. Dependant on future standards.
Notes	-	Required to be compliant by 1 July 2014	Appropriate filters can be used to remove taste, odour and protozoa at the point of use (about \$300 + \$80pa) Additional dosing points may be required around the network; costs are indicated by the high end of the cost ranges below.	Estimated PoE Unit Costs: UV Unit - including filtration \$1,600 - \$2,400 <i>(dependant on Government compliance requirements)</i> Installation Costs - inc. housing, electrical work and plumbing \$1,900 Total Estimated Cost per PoE Unit \$3,500 - \$4,300
Overall Finances:				
Capital Costs	-	\$6.2 million <i>(as at 2008)</i>	\$160,000 - \$250,000	\$1.75 million - \$2.15 million
Capital Costs - inc. Council 50% subsidy	-	\$1.98 million <i>(as at 2008, including Government grant)</i>	\$80,000 - \$125,000	\$0.88 million - \$1.08 million <i>(Council subsidy only available on first installation of UV units - future replacements will become an operating cost)</i>
Annual Operating & Maintenance Costs	-	\$196,000	\$13,100 - \$26,000	\$160,000 - \$200,000
Indicative annual cost of treatment to ratepayers	-	\$407 <i>(added to Uniform Annual Charge)</i>	\$9 - \$15 <i>(added to Uniform Annual Charge)</i>	\$770 - \$930 <i>(charging structure to be confirmed)</i>
Indicative increase to metered water rate due to treatment	-	\$1.39 <i>(or more if water consumption drops)</i>	\$0.05 - \$0.07	<i>(charging structure to be confirmed)</i>

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What is the poll for?

Mailed out with this flyer is a letter to residents requesting a response to a poll. This poll is to indicate to Council the level of support for the inclusion of the MIOX water treatment system proposal in the 2011/12 Draft Annual Plan. The poll answers are:

- **Yes** - I want to include the proposal for a MIOX water treatment system for the Awatere Water Supply in the 2011/12 Draft Annual Plan
- **No** - I do not want to include the proposal for a MIOX water treatment system for the Awatere Water Supply in the 2011/12 Draft Annual Plan

Council and the Awatere Settlers Association Water Sub-committee will consider the results of the poll. A decision will then be made on whether the proposed MIOX treatment system will be included in the Draft Annual Plan.

Inclusion in the Draft Annual Plan does not mean the proposal is a certainty, it just means that it is easier to get the proposal into the final Annual Plan, which ensures funds will be available for the project.

Submissions (either for or against the proposed treatment system) can be made in the Annual Plan process. The submission period for the 2011-12 Draft Annual Plan is expected to be from 1 April to 6 May 2011.

Further Information

Enquiries about drinking-water legislation, water funding, and network operation can be directed to Council staff:

- Robbie Strawford
Operations Engineer
- Erica Hobbs
Engineering Officer

Phone: 03 520 7400