

Memorandum

To: Jon Lamonte

CC: Mark Bourne, Amanda Singleton, Jamie Sinclair

From: Peter Rogers

Subject: Implications of New PFAS limit on Onehunga Water Supply

Date: 29 September 2022

1.0 Issue

On the 9th of June 2022 Taumata Arowai introduced a new maximum acceptable value (MAV) for per- and poly-fluorinated alkyl substances (PFAS) in drinking water supplies. The new MAV comes into effect from 14th November 2022. Existing treatment technology employed at the Onehunga water treatment plant (WTP) does not remove PFAS. Past monitoring for PFAS in the Onehunga water supply show PFAS levels above the new PFAS MAV on a limited number of occasions.

2.0 Background

PFAS are a group of synthetic chemical compounds which have been manufactured and used by a broad range of industries since the 1940s due to their oil and water repellent properties (United States EPA, 2022). A notable source of PFAS in the environment is from the historic use of fluorinated firefighting foams. PFAS are also very common additives to industrial processes and consumer goods such as waterproof clothing, cookware, cosmetics, paint, polish, and textile and electroplating industries. As products are used and disposed of, PFAS is discharged into the environment (New Zealand Ministry for the Environment, 2019).

PFAS are stable because of their carbon-fluorine bonds and are unlikely to react or degrade in the environment. The chemical properties of PFAS that lead to their use also make their removal from drinking water difficult with conventional water treatment processes similar to what is present at the Onehunga WTP. The most effective treatment technologies currently identified are GAC adsorption, ion exchange, nanofiltration and reverse osmosis. PAC adsorption has also been shown to be effective to a lesser extent (American Water Works Association, 2020).

PFAS levels in Drinking water and the concerns they raise have been reported by the media for a number of years both in New Zealand and overseas and is likely to be an ongoing topic of concern.

3.0 Regulatory Limits

The Taumata Arowai Drinking Water Standards (DWS) include MAVs for two PFAS compounds:

- SUM(PFHxS + PFOS): MAV 0.07 µg/L
- PFOA: MAV 0.56 µg/L

The DWS were published on the 9th of June 2022 and come into effect on the 14th of November 2022.

International research undertaken into various PFAS compounds and their effects on health and the environment, indicate even more stringent regulatory limits may come into effect in the future.

3.0 Onehunga Catchment Risk

While water sourced from the Onehunga aquifer is generally characterised as high quality, the aquifer is an unsecure groundwater source and is subject to external, surface water influences from a variety of industrial and residential activities past and present that pose a risk to the water quality. The Onehunga Aquifer has historically been occupied by a number of heavy industrial activities which have been known to have resulted in legacy contamination of land. Based on the nature of legacy contaminated sites in the area, a wide range of organic and inorganic contaminants are possible.

The nature of the aquifer, along with the wide range of current and historic industrial activities taking place within the catchment makes identifying the source(s) of PFAS contamination difficult.

4.0 Onehunga Source Water Quality

PFAS sampling completed across all of Watercare's WTPs in 2018 found PFAS to be below detection levels at all WTPs with the exception of Onehunga. Following this, monthly PFAS monitoring of Onehunga WTP treated water, as well as both the Rowe and Pearce Street wells was implemented.

Monthly monitoring results since March 2018 show that Onehunga WTP treated water exceeded the MAV of 0.07 µg/L for Sum (PFHxS + PFOS) on at least two occasions since the commencement of monitoring: the 10th of July 2019 (0.103 µg/L) and the 8th of June 2022 (0.119 µg/L). The highest result for PFOA in the treated water was also obtained on the 8th of June 2022 (0.17 µg/L). However, this was well below the MAV for PFOA of 0.56 µg/L.

Excluding the occurrences of elevated detections, the concentration of Sum (PFHxS + PFOS) in the Onehunga WTP treated water was normally just below 0.01 µg/L.

Available laboratory data for Sum (PFHxS + PFOS) has been compared against daily rainfall totals and available raw water monitoring instruments to determine if the elevated levels are related to rainfall and therefore could be predicted (see Appendix). With the limited sampling data available, it was not possible to determine any correlations. From the 17th of August 2022, daily composite samples are being collected at both the Rowe and Pearce Street wells, to provide a better understanding of the background levels of PFAS entering the Onehunga WTP.

5.0 WTP Performance

It is worth noting that concentrations of Sum (PFHxS + PFOS) and PFOA do not generally vary greatly between the raw (Rowe and Pearce Street Well) water samples and the treated water samples, indicating a lack of removal within the treatment process. This is not unexpected as no treatment technology to treat PFAS is currently employed at the water treatment plant.

6.0 Health Implications

MAV limits relate to lifetime exposures meaning health implications are only expected should a person be exposed to the chemical at levels above the MAV on a continuous basis over a lifetime.

It should be noted that PFAS in Onehunga treated water has only been detected on a few occasions above the MAV and is generally well below the MAV.

While the occasional result above the MAV will result in non-compliance to the limits, they do not represent a risk to human health due to the low frequency.

7.0 Reputational Implications

PFAS contamination in drinking water has been a topic of interest by media both in New Zealand and overseas for a number of years.

[Study Confirms PFAS In NZ Urban Water | Scoop News](#)

14/01/2022 — The presence of PFAS in New Zealand wastewaters, coastal waters, ... the treated wastewater and from a drinking water treatment plant.

<https://www.nzherald.co.nz> › whanganui-chronicle › news

[Ōhakea water drinkable five years after contamination ...](#)

16/08/2022 — Ōhakea residents have drinkable water again following the discovery of PFAS contamination in 2017. The Ōhakea Rural Water Scheme was initiated ...

<https://www.pressherald.com> › 2022/06/16 › new-feder...

[Even trace amounts of PFAS chemicals pose health risk, new ...](#)

16/06/2022 — On Wednesday, the U.S. Environmental Protection Agency issued drinking water recommendations that warn even trace amounts of two of the oldest, ...

Despite the risk to human health from intermittent exceedances of the MAV being very low there is still likely to be concern by customers and the intermittent non-compliances are likely to erode the trust of customers in the safety of the Onehunga water supply and Watercare. This is likely to occur at a time of increased focus on Watercare due to the current reforms underway.

8.0 Options

An initial review of operational options to address the situation in the short term include:

8.1 Do nothing.

This will result in the treated water from the Onehunga supply being non-compliant from time to time. Communications to carefully explain the non-compliances and health implications would need to be developed.

8.2 Periodically cease production when PFAS levels exceed the limit

There is currently no reliable way to predict when the elevated PFAS levels will occur, and testing results have a minimum turnaround time of 1 day. This will result in non-compliant water entering service from time to time.

8.3 Close Onehunga WTP.

This will ensure that water non-compliant for PFAS will not enter service from the Onehunga WTP. This will also result in the loss of around 21 MLD and negatively impact the supply and demand balance for the metropolitan system.

Options to determine the best long-term options for the Onehunga WTP will be considered by the Planning team and would likely include additional treatment barriers or dilution with water from other sources. However, these solutions would not be available by the 14th of November when the PFAS standards come into effect.

9.0 Impact of a closure of Onehunga WTP

To determine the impact of a closure of the Onehunga WTP to the metropolitan supply, a high-level update of Watercare's metropolitan supply and demand balance was undertaken using the evidence submitted to the Waikato Board of Inquiry as a base line. This baseline includes the addition of the newer plants such as Papakura and Pukekohe. Even with the addition of these plants, the removal of Onehunga from the supply demand balance will see a significant reduction in our headroom at peak summer demands. The impact on annual drought is less pronounced but will result in increased operational costs.

For summer 2023 we will see a potential headroom range of 9-13 ML/d compared to the forecasted peak demand modelled against Watercare's levels of service without the Onehunga WTP. By summer 2024 this headroom drops to 0.8-6ML/d. With the removal of Onehunga, drought yield headroom decreases by 33-36ML/d in FY23 and 22-26ML/d in FY24 due to not only loss of Onehunga's yield but also its impact on the conjunctive yield of the total system. This reduction in headroom will result in the earlier utilisation of Waikato, resulting in increased operational cost.

Another flow on effect will be the need to lift the drought trigger levels for the Drought Management Plan. Lifting of these trigger levels may result in failure to meet agreed levels of service in relation to the frequency of drought restrictions.

To mitigate the risk associated with the reduction in headroom from the closure of Onehunga WTP to the metropolitan supply Watercare will need to access the increased water take gained from the Waikato Board of Inquiry. This will increase the water available for use in peak demand periods by the following depending on the combination of Waikato and Waikato50:

- 82ML/d if both plants are operating and assuming a combined 'sustainable' peak output of 210ML/d
- 37ML/d with WKO50 shutdown and assuming a 'sustainable' peak output of 165ML/d for Waikato

This is based on removing the impact of RPV6 restrictions on our take. With both consents operating we would have access to 255ML/d if the river is in restrictions.

10.0 Customer

The closure of the Onehunga WTP will need to be carefully communicated to customers and the general public. The messaging will not only need to cover closure of the plant despite no risk to human health from intermittent PFAS exceedences, but also the introduction of fluoride as water will be supplied from the wider network which is fluoridated. Operations will work with the Communications team to develop a communications plan.

11.0 Conclusion

From the 14th of November 2022 the Watercare's Onehunga water supply runs the risk of being non-compliant with the new Drinking Water Standards for New Zealand for PFAS.

Current treatment processes at Onehunga WTP do not remove PFAS. There is no current means of predicting when the PFAS levels will increase to non-compliant levels.

Treatment processes to remove PFAS are unable to be implemented prior to the introduction of the new PFAS MAV on 14th November.

If the Onehunga WTP ceases production Watercare will need to implement the necessary steps required to access the increased water take from the gained from the Waikato Board of Inquiry

Longer term options/requirements such as an additional treatment barrier or dilution with an alternative source and the implications of shutting the Onehunga WTP on the metropolitan supply and demand balance have been raised with the Planning team to address.

PFAS contamination in drinking water continues to be a topic of interest reported by media.

12.0 Recommendation

Approval is sought for the following recommendations:

1. That the Onehunga WTP is closed as soon as possible prior to the 14th of November 2022 to ensure compliance with the new Drinking Water Standards and to maintain customer trust.
2. That a communication plan is developed and communicated to advise customers and stakeholders of the closure and implications.
3. That the consent to take more water from the Waikato gained under the board of enquiry is brought forward to provide additional headroom to compensate for the closure of the Onehunga WTP.
4. That the Papakura WTP and Pukekohe WTPs are retained in service to ensure resilience and headroom capacity for the Auckland metropolitan supply.
5. That investigations are initiated into using the Onehunga WTP as a non-potable supply while the Planning team investigates what is required to bring the plant back into potable supply.
6. That a provision is made in the Asset Management plan by the Planning team for the upgrade and reinstatement of the Onehunga WTP

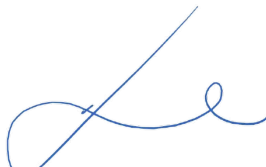
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APPENDIX

PFAS monitoring results for Onehunga Water Supply:

