ALAMEDA COUNTY WATER DISTRICT

REPORT ON WATER QUALITY
RELATIVE TO PUBLIC HEALTH GOALS
2022-2024

June 2025

Public Hearing
August 14, 2025

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1. PURPOSE OF REPORT

Alameda County Water District (ACWD) staff has prepared this report to inform consumers of constituents in their drinking water that exceeded the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) during calendar years 2022, 2023, and 2024. PHGs are established by California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) and MCLGs are developed by U.S. Environmental Protection Agency (EPA), respectively. This report is different from the annual Water Quality Report (commonly referred to as Consumer Confidence Report) which summarizes the water quality information of constituents detected in your drinking water each year. This report is intended to provide the public with information beyond the annual Water Quality Report and help consumers understand the health risks associated with the constituents that exceeded the PHGs or MCLGs, as well as the best available technology (BAT) and cost estimates to achieve further improvements in water quality above existing treatment capability and regulatory requirements.

1.1. Summary of Regulation

ACWD is subject to the provisions of the California Health and Safety Code 116470(b) which specifies that water utilities with more than 10,000 service connections prepare a special report beginning July 1, 1998, and every 3 years thereafter, if water quality measurements have exceeded any PHGs or MCLGs. Only constituents which have a California primary drinking water standard, and for which either a PHG or MCLG has been set, are to be addressed in the report. It should be noted that there are a few constituents (such as disinfection byproducts) that are routinely detected in the water system at levels below the drinking water standards, but neither PHGs nor MCLGs have yet been adopted; these constituents will be addressed in future reports when PHGs or MCLGs are adopted.

This report provides the information for years 2022, 2023, and 2024 for constituents that were detected in ACWD's finished water at a level exceeding the applicable PHGs or MCLGs. Included in this report is the numerical public health risk associated with the Maximum Contaminant Levels (MCLs), PHGs or MCLGs, the category or type of risk to health that could be associated with each constituent (Appendix A), the BAT available that could be used to reduce the constituent level, and an estimate of the cost to install treatment if it is appropriate and feasible.

1.2. Background Information

PHGs are non-enforceable goals established by the OEHHA and are based solely on public health risk considerations. OEHHA establishes PHGs at levels that pose little or no anticipated threat to human health. PHGs are set at levels where the potential health risk is considered to be no more than one additional cancer case (beyond what would normally occur) in a population of one million people, assuming consumption of 2 liters of water per day over a 70-year lifetime. In determining PHGs, OEHHA does not consider any of the practical risk-management factors that are considered by the EPA or the California Division of Drinking Water (DDW) in setting drinking water standards such as MCLs. These factors include analytical detection capability, treatment technology availability, benefits and costs. PHGs are not enforceable but establish goals that public water systems should strive, but are not required, to achieve. MCLGs are the federal equivalent to PHGs and similarly are for non-enforceable standards.

In a few instances, PHGs are set at levels below the Detection Limit for Reporting Purposes (DLR), which are established by DDW for each regulated contaminant. The DLR is designated as the minimum level at or above which any analytical finding of a contaminant in drinking water needs to be quantified and reported to DDW. In those instances where a water sample is found to contain a contaminant at a level less than the DLR, the contaminant is considered to be non-detect and reported as "ND".

In preparing the following report, all the water quality data collected by ACWD from 2022 to 2024 for the purpose of determining compliance with drinking water standards (data collected for constituents which have California primary drinking water standards) were considered in conjunction with all contaminants that have PHGs or MCLGs. Based on the data collected in 2022, 2023 and 2024, ACWD is required to prepare a report in 2025 and address constituents that were above the PHGs in these years. The data are also summarized in the annual Water Quality Report, which is published on ACWD's website by July 1 of each year. The 2025 suggested guidelines released by the Association of California Water Agencies were used in the preparation of this report.

2. ACWD SYSTEM DESCRIPTION

ACWD has four sources of water supply: 1) water imported from the State Water Project via the South Bay Aqueduct (SBA) which originates from the Sacramento/San Joaquin Delta and/or Lake Del Valle, 2) local groundwater pumped from the Niles Cone Groundwater Basin (Peralta-Tyson and Mowry Wellfields), which is replenished with local rainwater, runoff from the Alameda Creek watershed, and seasonal releases of SBA water, 3) water purchased from the San Francisco Public Utilities Commission (SFPUC) consisting of treated, but unfiltered, water from the Hetch Hetchy Reservoir and augmented by water from the Calaveras or San Antonio Reservoirs which is treated at the Sunol Valley Water Treatment Plant, and 4) desalinated brackish water pumped from six Aquifer Reclamation Program (ARP) wells (Cedar 1&2, Darvon 1&2, Farwell and Bellflower).

ACWD treats the imported SBA water at the 28 million gallons per day (mgd) Water Treatment Plant 2 (WTP2). ACWD's Blending Facility blends the softer SFPUC water with relatively hard groundwater from the Peralta-Tyson and Mowry Wellfields prior to delivery to the distribution system. The maximum production of the Blending Facility is approximately 45 mgd. ACWD operates the ARP wells to extract and control the movement of brackish water within the Niles Cone Groundwater Basin. Groundwater pumped from the ARP wells is treated to drinking water standards using state-of-the-art reverse osmosis (RO) technology at the Newark Desalination Facility (NDF), which has a maximum capacity of approximately 12.5 mgd. ACWD met water demand from 2022 to 2024 using production from the Blending Facility, WTP2, and the NDF. There are also several SFPUC connections (Durham, Warren, Washington, Central & Cherry, Mission Blvd., Paseo Padre and Sycamore Takeoffs) in Fremont and Newark that may be used to meet emergency and peak summer demands.

Figure 1 below shows the typical water distribution from ACWD's water sources. The customer's location in the Tri-City area determines the source of water received.

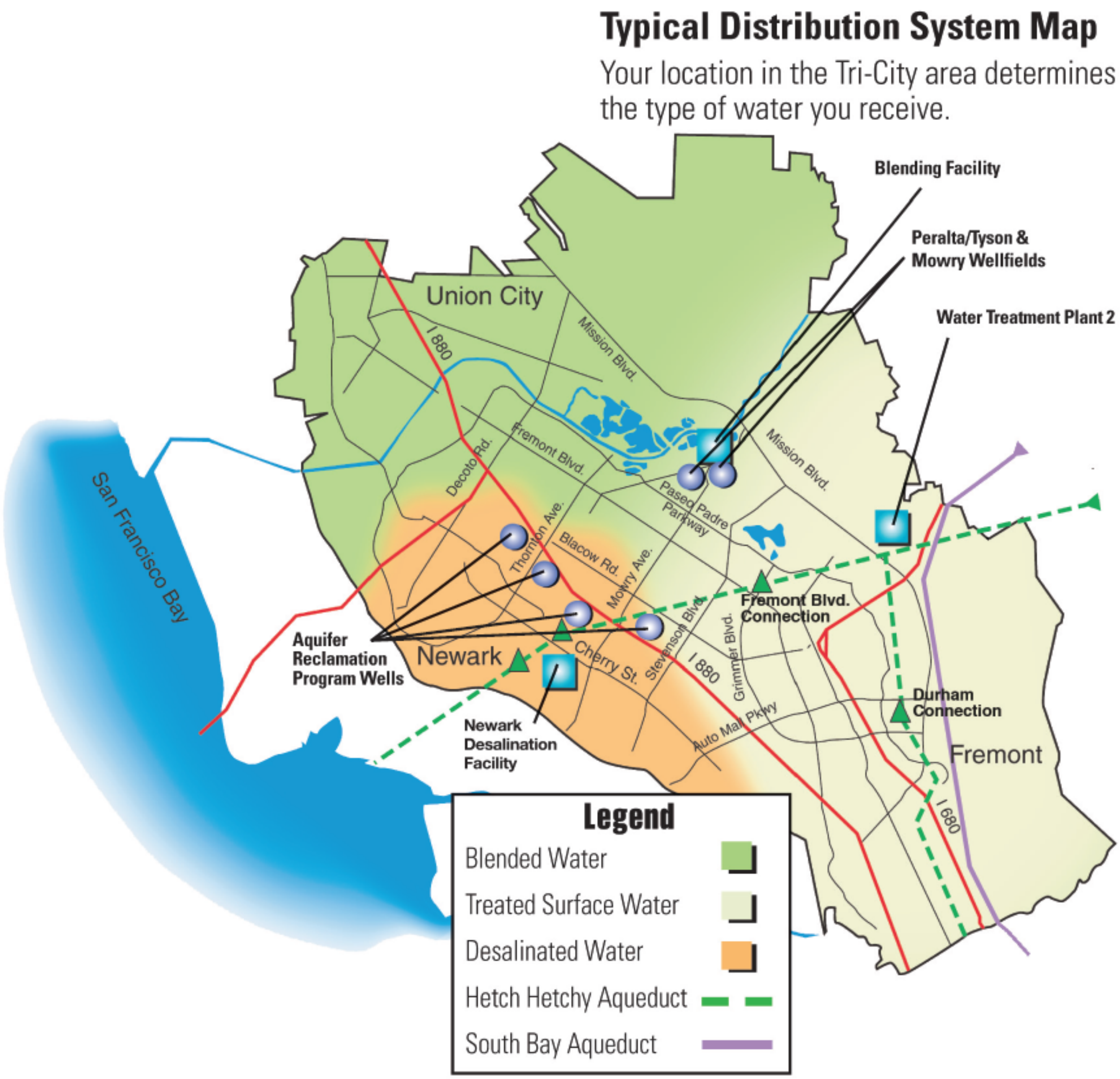

Figure 1. Typical Sources of Water in the Distribution System.

3. CONSTITUENTS DETECTED THAT EXCEED PHGs and MCLG

For more than 110 years, ACWD has supplied its customers with high quality drinking water that consistently meets or surpasses all federal and state drinking water standards. ACWD's annual

Water Quality Reports, which are published by July 1 every year, summarize the analytical results conducted on the drinking water from the preceding calendar year. Our 2022, 2023, and 2024 annual Water Quality Reports reflect that very few of the more than 180 substances that we routinely test for were found in our water supply. In the last three years, of more than 100 PHGs and MCLGs currently established, two constituents, bromate and a Per- and polyfluoroalkyl substance (PFAS) compound, Perfluorooctanesulfonic Acid (PFOS) were detected at levels above the PHGs and MCLGs, but remained well below the applicable federal and state enforceable standards. Total coliforms do not have a PHG or MCL, and are included in this report when the detections require a "find-and-fix" approach and requires that the cause of the issue be investigated and corrected. Table 1 below summarizes the constituents detected above the PHGs and MCLGs in ACWD water samples collected in 2022 through 2024.

Table 1. Constituents detected above PHGs between 2022 and 2024

Chemicals	Sample Date	Sample Locations	Unit	MCL	PHG/ [MCLG]	Detections	Notes
Bromate	2022, 2023 and 2024	WTP2[1] finished water	μg/L[2]	10	0.1/[0]	ND-2.3[3]	Range of quarterly RAA results[4]
PFOS	2022, 2023, and 2024	S-1 (entry point to distribution system from Blending Facility)	ng/L[5]	4	1/[0]	2.0-4.5[6]	Range of quarterly RAA results[7]
Total Coliform	2024	Distribution key point sample stations	# Positives	NA	--	1 event	Total coliform positives in November 2024 required investigation for a potential significant rise in bacterial count

[1]WTP2: Water Treatment Plant No. 2
[2]μg/L: micrograms per liter (μg/L) of water
[3]ND: Non-detect. Reporting limit for bromate is 1 μg/L
[4]Compliance with the California MCL for bromate is based on a running annual average (RAA).
[5]ng/L: nanograms per liter (ng/L) of water
[6]Data include detections during ACWD voluntary monitoring prior to establishment of regulatory standards. See Section 3.2. Reporting limit for PFOS is 2 ng/L
[7]Compliance with the Federal MCL for PFOS is based on a running annual average (RAA)

The following is a discussion of the constituents that were detected at levels above the established PHGs and MCLGs during the calendar years of 2022, 2023, and 2024.

3.1. Bromate

Background

When bromide (Br^-) is present in the source water at significant concentrations, formation of bromate (BrO_3^-) upon ozonation is a concern. Since bromate is a byproduct of the ozonation disinfection process, its formation is unique to WTP2 which is ACWD's only treatment plant using
ozone. At this treatment plant, bromide in source water reacts with ozone used for disinfection and controlling taste and odor compounds. Water from the SBA periodically experiences high levels of bromide, and ACWD has monitored bromide levels in raw SBA water for many years.

After pre-chloramination was implemented in 2011 to minimize bromate formation during the ozonation process, bromate was undetectable in the WTP2 finished water between 2011 and 2013. However, low levels of bromate were detected when bromide levels in SBA source water were elevated between 2022 and 2024. Figure 2 shows the average and range of bromide levels in 2022, 2023 and 2024. As bromide levels may vary in different water sources and exhibit seasonal fluctuation, the average bromide levels in 2022 were nearly three times the bromide levels in 2023 and two times the bromide levels in 2024. Since bromide is the key precursor of bromate formation, the increased levels of bromide, combined with impacts to the pre-chloramination system used at WTP2 resulted in detections of bromate (ND – 2.3 µg/L) at low levels in the finished water in 2022, 2023, and 2024. Bromate compliance is based on a running annual average (RAA) of the last 12 monthly sampling results, computed quarterly. The PHG of bromate is 0.1 µg/L which is below the DLR of 1 µg/L.

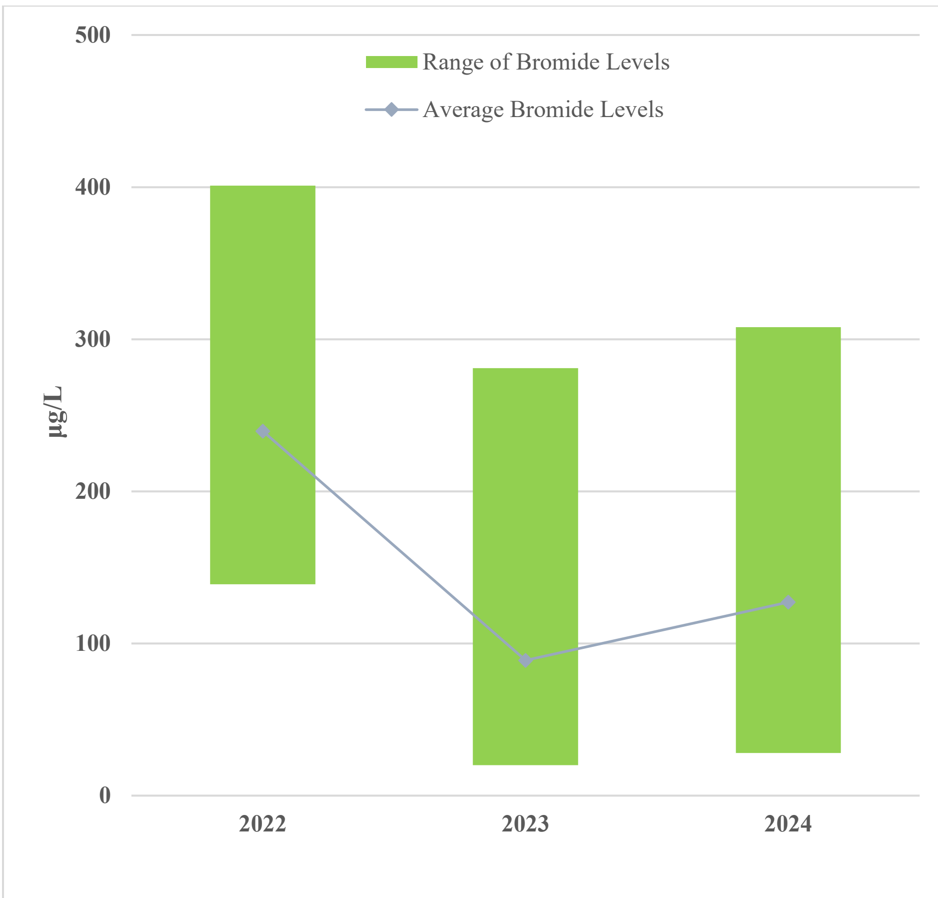

Figure 2. 2022-2024 Source (Raw) Water Bromide Levels Before Treatment

Health Risks

EPA classifies bromate as a Group B2 carcinogen (or "probable human carcinogen"). The MCL for bromate is set at 10 µg/L, based on the practical quantification limit. People who drink water containing bromate above the MCL throughout their lifetime (70 years) could experience an increased risk of getting cancer. For a PHG of 0.1 µg/L, the theoretical excess cancer risk is one in a million. The EPA MCLG for bromate in drinking water is set at 0 µg/L, based on carcinogenicity.

PHG Exceedance for Bromate

ACWD is in full compliance with the state and federal drinking water standard for bromate but has detected bromate above the PHG level of 0.1 µg/L between 2022 and 2024. As indicated in Figure 3, the RAA reported from 2022-2024 ranged from non-detect to 2.3 µg/L, which was well below the MCL of 10 µg/L. As previously discussed, bromate formation was higher initially in 2022 because of the elevated bromide levels in source water (see Figure 2). Although lowering the dose of ozone may reduce the level of bromate, a lower ozone dose would not be as effective at removing taste and odor compounds in source water, and most importantly meeting disinfection requirements of drinking water.

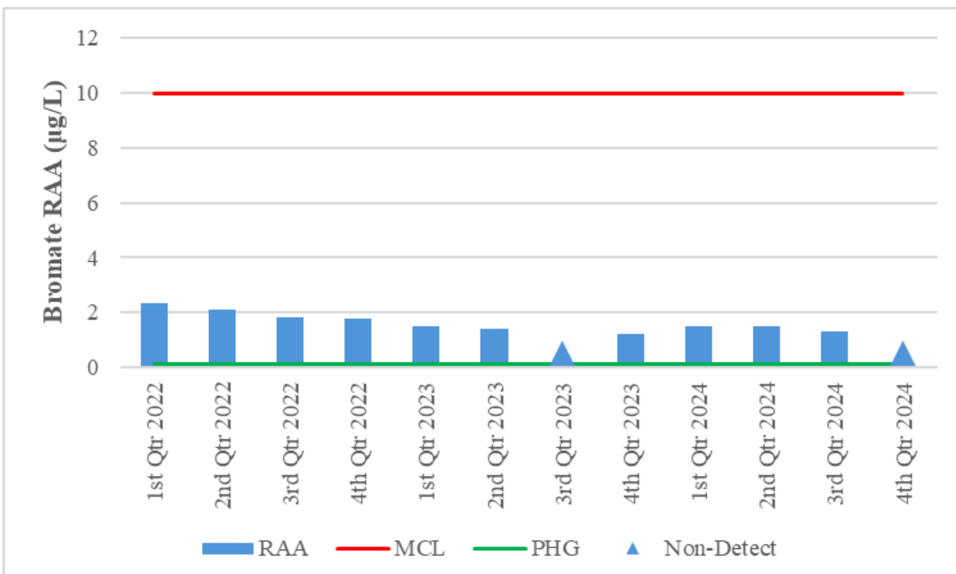

Figure 3. 2022 – 2024 Bromate Running Annual Average for WTP2

BAT for Bromate Control

The DDW and EPA consider "control of ozone treatment process to reduce production of bromate" as the best-available technology, or BAT, for reducing contaminant levels to the MCL for bromate control. ACWD has implemented several strategies for bromate reduction, including pH suppression and chloramination ahead of ozonation. The WTP2 finished water had detected low levels of bromate in 2022, 2023, and 2024 due to source water quality bromide variations and issues with pre-chloramination delivery system (in 2024). The bromate control strategies were successful in treating challenging source water and maintaining bromate concentrations well below the MCL. Considering these results, ACWD will continue to implement the control strategies for bromate control. The following section will further explain ACWD's bromate control strategies.

ACWD's Activities to Reduce Bromate

Bromate formation and control during ozonation has been extensively studied since the early 1990s when bromate was implicated as an ozonation byproduct and potential carcinogen. The general consensus from the earlier studies was that pH suppression was the most consistent and reliable method for maintaining bromate levels below the regulatory standard. Since early 2002, ACWD has successfully controlled bromate formation using pH suppression via the addition of carbon dioxide ahead of ozonation. By reducing the pH, ACWD had been able to maintain the plant effluent bromate concentration at less than the MCL of 10 μg/L.

However, using pH-adjustment for bromate control has its limitations when bromide levels are high in the source water. Between 2007 and 2009, ACWD conducted bench and plant scale studies to evaluate the pre-chloramination strategy for effective bromate control. The results of the studies demonstrated that pre-chloramination ahead of ozonation is a highly-effective bromate control strategy. Compared to the pH suppression strategy, pre-chloramination was proven to be capable of reducing bromate formation by 81%. Furthermore, the effectiveness of pre-chloramination is not significantly impacted by normal variations in raw water bromide. No significant adverse effects were found on other plant processes and in the distribution system monitoring sites. In light of these results, ACWD has continuously employed pre-chloramination since 2011.

The pre-chloramination delivery system experienced calcification deposits in the chemical carrier pipeline that resulted in temporary shutdowns to clean and unblock the supply lines in 2023 and 2024. During these times, ACWD operated the ozonation disinfection process with pH suppression only which caused bromate formation above the detection limit but well below the MCL. To avoid this issue in the future, ACWD has implemented additional preventive cleaning and descaling of the pipelines to reduce the chances of prolonged shutdown of the pre-chloramination system in the future.

3.2. Perfluorooctanesulfonic Acid (PFOS)

Background

Perfluorooctanesulfonic Acid (PFOS) is a PFAS, a group of persistent manmade chemicals used in numerous products for their ability to repel water, stains, and oils. Long-term exposure to PFAS may lead to health issues such as decreased fertility, weakened immunity, increased cancer risk, and elevated cholesterol. To protect drinking water quality due to these potential risks, DDW has issued PFAS monitoring orders to several entities, including community water systems, within California.

Water agencies across the country are working to identify and treat PFAS in common sources like surface and groundwater. California's DDW began a statewide PFAS investigation in March 2019, requiring testing for water utilities near potential contamination sites. Though ACWD did not receive these orders due to the location of its groundwater sources, ACWD proactively began voluntary PFAS monitoring in June 2020 across its sources (groundwater and surface water) and treated water. PFOS was detected in low levels in the wellfields supplying groundwater to ACWD's Blending Facility. Effective January 1, 2023, DDW issued quarterly PFAS monitoring orders for all ACWD groundwater sources. PFAS data, from voluntary monitoring and required monitoring from DDWs order, is posted on ACWD's website.

Health Risks

The EPA reports that current peer-reviewed scientific studies have shown that exposure to certain levels of PFAS may lead to:

- Reproductive effects such as decreased fertility or increased high blood pressure in pregnant women.
- Developmental effects or delays in children, including low birth weight, accelerated puberty, bone variations, or behavioral changes.
- Increased risk of some cancers, including prostate, kidney, and testicular cancers.
- Reduced ability of the body's immune system to fight infections, including reduced vaccine response.
- Interference with the body's natural hormones.
- Increased cholesterol levels and/or risk of obesity.

Effective April 2024, EPA established the MCL for PFOS at 4 nanograms per liter (ng/L) . People who drink water containing PFOS above the MCL throughout their lifetime (70 years) could experience an increased risk of cancer. For a PHG of 1 ng/L, the theoretical excess cancer risk is one in one million. The EPA MCLG for PFOS in drinking water is set at 0 µg/L, based on potential carcinogenicity.

In February 2020, DDW established a Notification Level for PFOS at 6.5 ng/L. Notification Levels are non-regulatory health-based advisory levels.

PHG Exceedance for PFOS

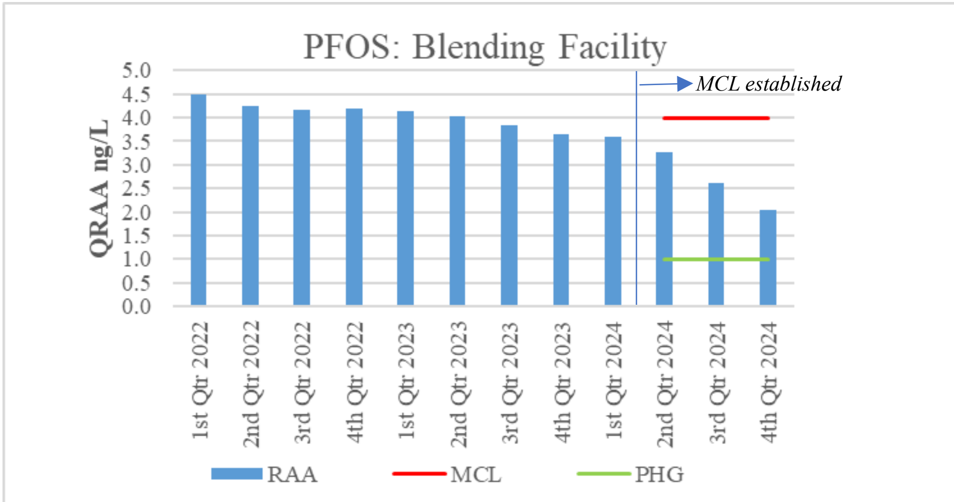

Figure 4. 2022 – 2024 PFOS Running Annual Average for Blending Facility

ACWD is in full compliance with the state notification levels and the federal drinking water standard (MCLs) for PFOS, since its establishment in 2024, but has detected PFOS above the PHG level of 1 ng/L between 2022 and 2024 in the treated (blended) water at the Blending Facility. Compliance with the Federal drinking water standard for PFOS is based on a quarterly running annual average (RAA).

Blended water consists of a combination of purchased SFPUC water and local groundwater. The groundwater supply comes from the Niles Cone Groundwater Basin which underlies the Tri-City area and is replenished through infiltration from local rainwater, runoff from the Alameda Creek watershed, and water from the SBA. Purchased SFPUC water is blended with water from the Peralta/Tyson and Mowry Wellfields and treated at ACWDs Blending Facility. As indicated in Figure 4, the RAA reported from 2022-2024 ranged from 2.0 to 4.5 ng/L. The detections above the MCLs were measured before the establishment of an MCL.

BAT for PFOS Control

The EPA considers granular activated carbon (GAC), ion exchange resins (IX), and high pressure membrane systems (such as reverse osmosis (RO)**)** as the best available technologies to remove PFAS from water.

GAC is a widely used adsorption technology effective for longer-chain PFAS like PFOA and PFOS due to their hydrophobic nature, which allows them to adhere to the carbon's surface area. However, it is less efficient at removing shorter-chain PFAS. Ion exchange resins, particularly anion exchange resins, utilize electrostatic and hydrophobic interactions to attract and bind PFAS, including shorter-chain varieties, and can sometimes offer a smaller footprint compared to GAC. RO is a membrane filtration process that can effectively remove a broad range of PFAS, including short-chain compounds, by using high pressure to force water through a semi-permeable membrane that blocks PFAS molecules. However, RO generates a concentrated waste stream that requires further management.

ACWD's Activities to Reduce PFOS

To proactively address PFOS contamination in drinking water, ACWD used the results of its voluntary PFAS monitoring program to identify blend ratios that would maintain levels of PFAS in the treated water served to our customers, initially below California's PFAS Notification Levels and later, the subsequently adopted federal PFAS MCLs. This was accomplished using purchased SFPUC water as a PFAS free source to blend with PFAS-impacted groundwater.

As a more permanent solution, ACWD constructed and commissioned, in September 2024, a 6 million-gallons-per-day (MGD) IX PFAS treatment system at the Blending Facility to treat a portion of the incoming groundwater. This PFAS treatment system was designed to accommodate a potential future expansion of treatment capacity up to 15 MGD. ACWD maintains a blend of purchased SFPUC water and treated and untreated well water, with the goal of minimizing PFOS levels to be consistently below the MCL at the blending facility's entry point to the distribution system. Since the IX system treats a portion of the incoming groundwater, PFOS may be undetectable at some blending facility rates, indicating the effectiveness of these combined strategies under certain conditions.

Estimated Cost of Treatment

Both EPA and DDW adopt what are known as BATs, which are the best known methods of reducing contaminant levels to the MCL. Costs can be estimated by such technologies. However, since many PHGs and all MCLGs are set much lower than the MCL, it is not always possible nor feasible to determine what level of treatment would be needed to reduce a constituent downward to or near the PHG or MCLG, many of which are set at zero. Estimating the costs to reduce a constituent to zero is difficult, if not impossible because it is not possible to verify by analytical means that the level has been lowered to zero. In some cases, installing treatment to try and further reduce very low levels of one constituent may have adverse effects on other aspects of water quality.

To address PFAS contamination, ACWD has made substantial investments in advanced treatment for PFAS compounds. A 6 MGD IX treatment system was constructed at the blending facility to reduce PFAS compounds, including PFOS levels to below MCLs, at a cost of $25 million. Annual operation and maintenance for this 6 MGD system are expected to be $870 to $970K per year. A larger, 15 MGD PFAS treatment system would be necessary to treat all groundwater entering the Blending Facility to reduce PFOS levels to below the analytical detection limit of 2 ng/L, at current anticipated production rates. Preliminary cost estimates indicate that an expansion of the 6 MGD treatment system to a 15 MGD IX treatment system would cost an additional $18 million, with an annual operation and maintenance cost increase ranging between $2 million and $2.2 million.

The estimated cost per customer for the construction of an expanded IX treatment system would be $212 with an estimated annual recurring cost of $26 in operating and maintenance expenses.

3.3. **Total Coliforms**

Background

Total coliforms are a large group of bacteria that are commonly found in the environment. While many total coliform bacteria are harmless, their presence in a drinking water distribution system is a concern because they can indicate that other, more harmful microorganisms (pathogens) might also be present. The primary concern with total coliforms is that they indicate a potential pathway for pathogens to enter the water supply. While total coliforms themselves may not cause illness, their presence suggests that other disease-causing microorganisms (bacteria, viruses, parasites) could be present.

ACWD complies with both the California revised Total Coliform Rule (rTCR) and the federal rTCR.

The California rTCR, effective since July 1, 2021, replaces the total coliform MCL with a treatment technique, requires investigation of a possible significant rise in bacterial count, and directs triggered assessments (Level 1 or 2) based on contamination levels, along with repeat sampling protocols, all aimed at proactively ensuring safe drinking water, and requiring public notification in the event of *E. coli* violations.

The rule specifies the number of routine samples per month based on the population served or the number of service connections, and requires water systems to have a sample siting plan which identifies sampling locations and schedules. ACWD conducts monitoring for bacteriological activity and collects and analyzes over 200 samples per month from multiple (53) locations throughout the service area monthly for total coliforms.

Health Risks

While total coliform bacteria themselves are generally not harmful, EPA considers their presence as a useful indicator of potential pathogens (disease-causing microorganisms) in drinking water. Such pathogens could include bacteria, viruses, and parasites that originate from human or animal waste.

The health risks associated with total coliform in water are **indirect**, stemming from the possible presence of these harmful contaminants. Ingesting water contaminated with such pathogens can lead to various illnesses, including:

- **Gastrointestinal issues:** Diarrhea, nausea, vomiting, and stomach cramps are common symptoms.
- **Other illnesses:** Fever, headaches, and even more severe conditions like dysentery, typhoid fever, and hepatitis can occur depending on the specific pathogens present.

The presence of total coliform indicates a potential pathway for dangerous microorganisms to enter the water supply. The California rTCR established a “find and fix” approach to investigate and correct the causes of coliform problems with water distribution systems to prevent the occurrence of these health risks. The rTCRs focus on *E. coli* is due to its more direct link to fecal contamination and a higher likelihood of accompanying harmful pathogens.

Total Coliform Positives Triggering an Investigation.

Per the rTCR, water systems are required to determine whether a possible significant rise in bacterial count has occurred for each month. Conditions that are considered to indicate a possible Significant Rise in Bacteria Count include: (1) a total coliform positive (TC+) routine sample followed by two TC+ samples in a repeat sample set; (2) a sample which is positive for E. Coli; and (3) the system fails the E. Coli MCL. Total coliforms do not have an MCL or PHG, however, if an incident requires a “find-and-fix” approach, they are included in this report.

In November 2024, a TC+ routine sample followed by three TC+ samples in the repeat sample set triggered an investigation for a possible Significant Rise in Bacterial Count. The coliform positive samples in the distribution system were traced to having originated from Alameda Reservoir which had recently been returned to service, after being drained and out of service for approximately two years for seismic improvements to its roof and other significant site improvements to include a booster station located at the inlet/outlet pipeline of the reservoir. DDW was promptly notified and a “find-and-fix” approach was taken following DDW guidance. The actions included isolating and chlorinating the reservoir, confirmation of disinfection processes at ACWD’s water treatment facilities, verifying adequate pressure within the distribution system, flushing areas of the distribution system, and implementing an expanded investigatory sampling plan. Corrective actions included partially draining and re-chlorinating the reservoir and resampling to confirm no total coliforms were detected prior to returning the reservoir to service.

BAT for Total Coliform Control

The DDW has specified BATs for microbiological contaminants, including total coliform and E. Coli. These include: (a) Protection of wells from fecal coliform contamination by appropriate placement and construction; (b) Maintenance of a disinfectant residual throughout the distribution system; (c) Proper maintenance of the distribution system including appropriate pipe replacement and repair procedures, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, cross connection control, and continual maintenance of positive water pressure in all parts of the distribution system; (d) Filtration and/or disinfection of approved surface water, or disinfection of groundwater, using strong oxidants such as chlorine, chlorine dioxide, or ozone; and (e) For a system using groundwater, compliance with the groundwater portion of a Drinking Water Source Assessment and Protection Program.

ACWD Programs

To reduce the chances of waterborne illnesses, ACWD utilizes ozone and chlorine as the primary disinfectants in water treatment processes. Chloramines are used to maintain a residual disinfectant level and minimize the formation of disinfection byproducts in the distribution system. The careful balance of treatment processes used is essential to continue supplying customers with high quality drinking water that meets or surpasses all state and federal drinking water standards.

In conjunction with ACWD's disinfection practices, ACWD maintains a water main cleaning program, a tank and reservoir cleaning program, a tank and reservoir surveillance program and a cross-connection control program. Treatment and distribution system disinfectant residuals are regularly monitored, wells are prudently protected from microbiological contamination, and positive water pressures are maintained throughout the distribution system. These measures help reduce the potential for TC+ occurrences in ACWD's water sources and distribution system.

Other ACWD's Activities

To ensure representative bacteriological samples are collected in the distribution system, ACWD regularly provides refresher training to staff that collect bacteriological samples. ACWD staff routinely inspects the sample stations. Additionally, a proactive maintenance and replacement program was implemented to ensure all sampling stations are secured and remain in good condition. Sampling protocols and practices are reviewed and updated periodically.

4. RECOMMENDATIONS

The drinking water served by ACWD meets all DDW and EPA drinking water standards. From 2022 to 2024, the only constituents detected above their PHGs or MCLG were bromate and PFOS.

4.1. Bromate

The data from 2022 to 2024 demonstrates that pre-chloramination ahead of ozonation is a highly-effective bromate control strategy. ACWD will continue to employ pre-chloramination as the key bromate control strategy, supplemented with pH suppression as applicable, to reduce the bromate levels at WTP2. Since ACWD has employed the BAT for bromate control, no cost analysis is recommended. ACWD will continue to optimize treatment by implementing pre-chloramination to reduce the RAA of bromate to as close as to the PHG as practically possible at WTP2.

4.2. PFOS

Data from 2024 shows a reduction of PFOS concentrations at the Blending Facility treated water following implementation of a blending strategy and the installation of a 6 MGD IX PFAS treatment system. With these strategies, ACWD is able to consistently maintain PFOS levels below the MCLs at current expected Blending Facility production rates.

The 6 MGD IX system is able to treat a portion of the total available groundwater to the Blending Facility. As noted earlier, a 15 MGD PFAS treatment system would be necessary to treat all groundwater normally entering the Blending Facility to "non-detect" levels of 2 ng/L. ACWD will continue its PFAS monitoring program, and minimize PFAS levels in treated water delivered to our customers from the Blending Facility using the IX PFAS treatment system and blending with purchased SFPUC water.

4.3. **Total Coliform**

ACWD will continue to implement the best available technologies and practices to minimize the occurrence of total coliform positives in the distribution system by a combination of maintaining healthy disinfectant residuals within treatment processes and in the distribution system. ACWD will also continue other programs, including main flushing, reservoir cleaning, storage systems surveillance program, well inspection program, cross connection control program, and maintaining a positive pressure in the distribution system.

REFERENCES

1. Alameda County Water District (2020). Water Quality Monitoring Plan.

2. Alameda County Water District (2021). Bacteriological Sample Siting Plan.

3. Association of California Water Agencies (2025). Public Health Goals Report Guidelines to satisfy requirements of California Health and Safety Code Section 116470(b).

4. California DDW (2021). California Regulation Related to Drinking Water.

5. Neeman, J, et al (2004). Controlling Bromate Formation During Ozonation with Chlorine and Ammonia" *Journal AWWA*, 96:2:26.

6. OEHHA (2025). Health Risk Information for Public Health Goal Exceedance Reports.

7. Jacobs, S (1998). Alameda County Water District: Evaluation of Distribution System Hardness and Corrosion Control Report.

8. Water Quality & Treatment Solutions, Inc. (2010). Comparison of Bromate Control Strategies: pH Suppression vs. Chloramine Addition.

APPENDIX A

Health Risk Categories and Cancer Risk Values for Chemicals
with California Public Health Goals (PHGs)

The following table was adapted from the Office of Environmental Health Hazard Assessment's Table 1, "Health Risk Categories and Cancer Risk Values for Chemicals with California Public Health Goals"

Chemical	**Health Risk Category**[1]	**California**[2] **PHG (mg/L)**	**Cancer Risk**[3] **@ PHG**	**California MCL**[4] **(mg/L)**	**Cancer Risk @ California MCL**
Bromate	Carcinogenicity (causes cancer)	0.0001	1×10^{-6}	0.01	1×10^{-4} (one per ten thousand)
Perfluorooctaonesulfonic Acid (PFOS)	Carcinogenicity (causes cancer)	0.000001	0.000001	NA	NA

[1] Health risk category based on experimental animal testing data evaluated in the OEHHA PHG technical support document unless otherwise specified.
[2] mg/L = milligrams per liter of water (PHGs are expressed here in milligrams per liter for consistency with the typical unit used for MCLs and MCLGs.)
[3] Cancer Risk = theoretical 70-year lifetime excess cancer risk at the statistical upper confidence limit. Actual cancer risk may be lower or zero. Cancer risk is stated in terms of excess cancer cases per million (or fewer) population, e.g., $1\times^{10-6}$ means one excess cancer case per million people; 5×10^{-5} means five excess cancer cases per 100,000 people.
[4] MCL = maximum contaminant level.