

PFAS (Per- and Polyfluoroalkyl Substances) Information

What are PFAS?

PFAS are a group of human-made chemicals that are specifically designed to be resistant to heat, water and oil. PFAS are used in fire-fighting foams and a wide range of industrial and consumer products such as stain- and water-resistant clothing, carpets, cleaning products, non-stick cookware and food packaging. Over 6,300 PFAS might have been manufactured and used worldwide since the 1940's. PFAS are unregulated emerging contaminants of concern in drinking water due to a host of potential health impacts and the tendency of PFAS to accumulate in groundwater.

The most studied PFAS chemicals are Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). Studies indicate that PFOA and PFOS can cause reproductive and developmental, liver and kidney, and immunological effects in laboratory animals. Since these chemicals have been used in an array of consumer products, scientists have found PFOA and PFOS in the blood of nearly all people tested. Between 2000 and 2002, PFOS production was voluntarily discontinued in the U.S. by its primary manufacturer. Beginning in 2006, other manufacturers began to voluntarily limit the number of ongoing uses through the [PFOA Stewardship Program](#). According to the [Center for Disease Control \(CDC\)](#), blood levels of both PFOS and PFOA have steadily decreased in the U.S. residents since CDC testing began in 1999. From 1999 to 2014, blood PFOA and PFOS levels declined by more than 60% and 80%, respectively. The median blood levels in 2014 were about 2 parts per billion (ppb) for PFOA and 5 ppb for PFOS.

What are the pathways for exposure to PFAS?

Studies have found PFOS and PFOA in the blood of samples of the general human population and wildlife, indicating that exposure to the chemicals is widespread. Potential exposure pathways include:

- Exposure through food, which can be contaminated through contaminated soil and water used to grow the food, food packaging containing PFAS and equipment that used PFAS during food processing.
- Release of chemicals through normal use, biodegradation or disposal of consumer products that contain PFAS.
- Exposure through commercially treated products manufactured to be stain- and water-repellent or non-stick. People employed at PFAS production facilities or manufacturers of PFAS containing products may be exposed.
- Drinking water can be a source of exposure. Such contamination is typically localized when an industrial facility where PFAS were produced or used in manufacturing was located nearby. The same applies to oil refineries, airfields or other locations where PFAS were used in firefighting.

PFAS related regulatory developments

PFOA and PFOS are the most well-known PFAS compounds and have been the primary focus of media and regulatory attention. The U.S. Environmental Protection Agency (EPA) has a lifetime [health advisory](#) of 70 parts per trillion (ppt) for PFOA and PFOS, either singly or combined. This health advisory offers a margin of protection for all Americans throughout their life from adverse health effects resulting from exposure to PFOA and/or PFOS in drinking water.

PFOA and PFOS are currently on EPA's fourth Contaminant Candidate List ([CCL4](#)) for future regulatory consideration. Additional PFAS monitoring is anticipated under EPA's upcoming fifth cycle of the Unregulated Contaminant Monitoring Rule ([UCMR5](#)). The Safe Drinking Water Act defines "contaminant" as any physical, chemical, biological or radiological substance or matter in water. Drinking water may reasonably be expected to contain at least small amounts of some contaminants. Some contaminants may be harmful if consumed at certain levels in drinking water. The presence of contaminants does not necessarily indicate that the water poses a health risk.

California also has begun the process of establishing regulatory standards (i.e., maximum contaminant levels) for these chemicals. In March 2019, California launched a state-wide [PFAS phased investigation](#) and issued Orders to operators of hundreds of susceptible drinking water sources, including Zone 7, to conduct quarterly PFAS monitoring for at least one year. Currently, California has drinking water notification levels (NL) of 5.1 ppt for PFOA and 6.5 ppt for PFOS, and [response levels \(RLs\) of 10 ppt for PFOA and 40 ppt for PFOS](#). NLs are a non-regulatory, precautionary health-based measure for concentrations in drinking water that warrant notification and further monitoring and assessment. Water systems are not required to monitor for contaminants with NL or RL; however, if they do monitor, and a contaminant exceeds a NL, certain notification is required. Under California

Assembly Bill 756 (codified as Health and Safety Code section 116378), starting in January 2020, California's State Water Board is authorized to order a public water system to monitor for PFAS and provide additional public notification for any PFAS detection.

What are available treatment technologies to remove PFAS?

Technologies with demonstrated effectiveness to remove PFAS from drinking water include granular activated carbon filters, ion exchange and high-pressure membranes such as nanofiltration and reverse osmosis (RO) filtration. Point-of-use water filters are also available on the market.

Are PFAS detected in Zone 7 Water Supply?

Zone 7 supplies treated drinking water to the retail and direct customers in the Livermore-Amador Valley. Typically, Zone 7 supplies approximately 80% treated surface water and 20% groundwater pumped by its wells to its water customers. This ratio of surface water to groundwater varies depending upon the season, hydrologic conditions and customer's location in the Valley.

Since protecting our customers' health and safety is our highest priority, Zone 7 voluntarily conducted proactive monitoring for several PFAS at some of its water supply sources in 2013, and at all sources in late 2018 and early 2019. Zone 7 also has completed 4 quarters of sampling per State's March 2019 Order. 2013 PFAS monitoring included representative production wells, but there were no detections, potentially due to analytical limitations. For example, the Minimum Reporting Limit is now 2 ppt for most PFAS versus 20 ppt for PFOA and 40 ppt for PFOS back in 2013. Also, we are now able to monitor for more analytes: the 2013 PFAS monitoring included 6 chemicals and the latest monitoring was expanded to 18 chemicals.

In summary, Zone 7 did not detect any PFOA or PFOS in its treated surface water supplies which made up majority of the total water delivered to its customers. Although Zone 7 did detect PFOA and/or PFOS in some of Zone 7's groundwater sources, they were blended and/or treated below the applicable RL.

Other PFAS – Perfluorobutanesulfonic acid (PFBS), Perfluoroheptanoic acid (PFHpA), Perfluorohexanesulfonic acid (PFHxS), and Perfluorohexanoic acid (PFHxA) – have also been detected in some of Zone 7's groundwater sources, but at present there are no regulatory guidelines for these contaminants. No PFAS were detected in Zone 7's Hopyard Wells.

What are sources of the PFAS contamination in water supplies?

Since PFAS chemicals are used in array of industrial and consumer products, there could be many sources of contamination in the water supplies. Common sources of PFAS include groundwater plumes associated with areas where fire-fighting foam was used, wastewater effluent or air emissions from industrial facilities where PFAS are manufactured or used, and landfills, including leachate, where materials with high levels of PFAS have been disposed. Zone 7 has not identified any single source in its service area for these contaminants.

What actions has Zone 7 taken to protect the public from PFAS exposure?

- Informed State Water Board, Zone 7 Board, and its retail and direct customers of its initial PFAS findings.
- Implemented procedures to reduce PFOS below the RL in the delivered water from the Mocho Wellfield; Zone 7's current PFAS treatment tools include RO Membrane filtration and blending of water sources.
- Posted PFAS information on the [Zone 7 website](#), e-newsletters, and [annual consumer confidence reports](#).
- Completed 4 quarters of monitoring per State's March 2019 Order.
- Completed 3 rounds of groundwater basin sampling to investigate potential sources of contamination.
- Completed a [PFAS Treatment Feasibility Study](#) to assess additional treatment options (including cost estimates) for treating PFAS to potential regulatory standards as well as to the lowest technically and economically feasible levels.
- Conducting a study to characterize the extent of PFAS across the groundwater basin and to identify potential sources of contamination; Target completion date for the study is by the fall of 2020.
- Continue to monitor for PFAS in affected operating wells and blended/treated water samples.
- Continue to track regulatory and research developments related to PFAS.
- Continue to provide periodic update to the Zone 7 Board and customers.

For more information, please contact Zone 7 at waterquality@zone7water.com

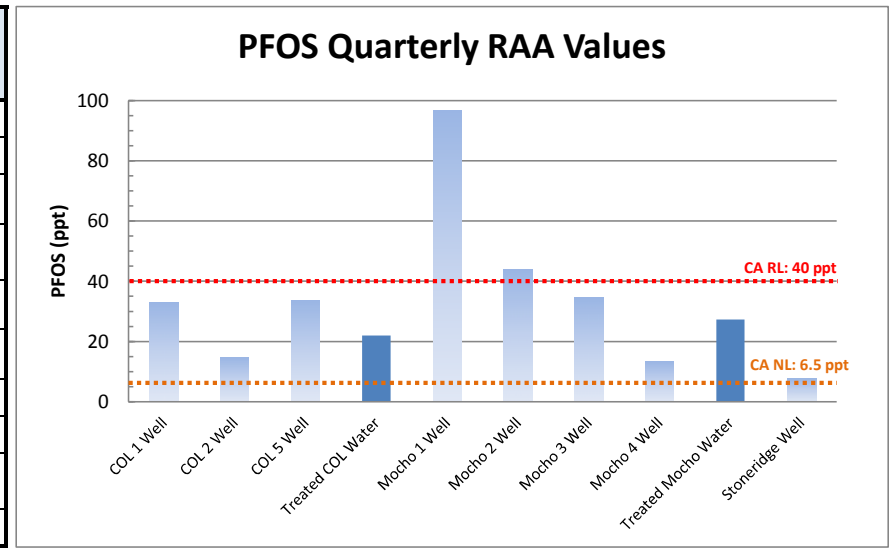
PFOS/PFOA Quarterly Sampling Results and Calculated Running Annual Average (RAA) Values

Water System Name: Zone 7 Water Agency

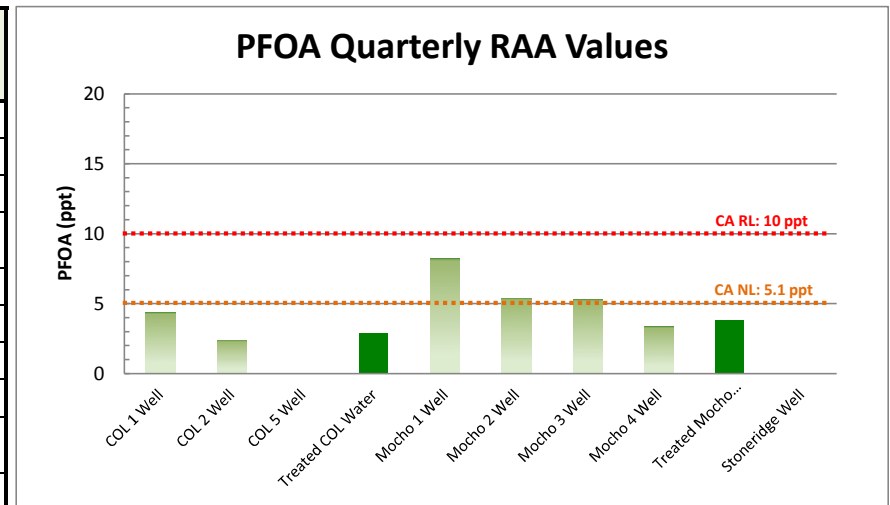
Year: 2020

Qtr: 2

Sample Name	Quarterly PFOS (ppt)						Current Qtr RAA	RAA of Treated Water < RL?
	2019				2020			
	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	1 st Qtr	2 nd Qtr		
COL 1 Well	29	44	33	28	NS	38	33	√
COL 2 Well	12	15	16	13	NS	15	15	√
COL 5 Well	52	42	40	15	NS	46	34	√
Treated COL Water - El Charro Pipeline*	NS	31	NS	19	NS	25	22	√
Mocho 1 Well	93	73	110	100	NS	80	97	Well is blended/treated before distribution, see Treated Water below
Mocho 2 Well	48	26	50	41	NS	41	44	Well is blended/treated before distribution, see Treated Water below
Mocho 3 Well	32	35	39	30	NS	35	35	√
Mocho 4 Well	4	12	14	12	NS	14	13	√
Treated Mocho Water - MGDG_FW**	9	20	29	30	NS	23	27	√
Stoneridge Well	5	12	8	8	NS	8	8	√



Sample Name	Quarterly PFOA (ppt)						Current Qtr RAA	RAA of Treated Water < RL?
	2019				2020			
	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	1 st Qtr	2 nd Qtr		
COL 1 Well	4	6	4	4	NS	5	4	√
COL 2 Well	ND	3	3	2	NS	2	2	√
COL 5 Well	2	2	ND	ND	NS	ND	0	√
Treated COL Water - El Charro Pipeline*	NS	3	NS	2	NS	3	3	√
Mocho 1 Well	10	8	9	9	NS	7	8	√
Mocho 2 Well	6	5	6	5	NS	5	5	√
Mocho 3 Well	6	6	6	5	NS	5	5	√
Mocho 4 Well	3	3	4	3	NS	4	3	√
Treated Mocho Water - MGDG_FW**	3	4	4	4	NS	4	4	√
Stoneridge Well	ND	2	ND	ND	NS	ND	0	√



Notes:
 *El Charro Pipeline Sampling Station represents treated COL water downstream of COL Chloramination Facility.
 **MGDG_FW Sampling Station represents treated Mocho water downstream of Mocho Groundwater Demineralization Plant.
 RAA = Running Annual Average = Average of previous 4 available quarterly values;
 NL = Notification Level; This is a health-based concentration of a contaminant in drinking water that warrants notification and further monitoring and assessment.
 RL = Response Level; This is the advisory level at which the source is taken out of service or treatment is provided.
 ppt = parts per trillion;
 ND = Not Detected (< 2 ppt) and a zero value is used for the purpose of calculation.
 NS = Not Sampled;