

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. Nearly 5,000 PFAS 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 health impacts and the tendency of PFAS to accumulate in groundwater.

Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) are two of the most widely studied PFAS compounds. Exposure to PFOA and PFOS can cause adverse health effects, including harmful effects to a developing fetus or infant, immune system and liver effects, and cancer. 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 regulatory attention. In May 2016, the U.S. Environmental Protection Agency (EPA) issued 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 PFOS in drinking water.

EPA also placed both PFOA and PFOS on its fourth Contaminant Candidate List ([CCL4](#)) in 2016 for future regulatory consideration. 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.

In July 2018, the California State Water Resources Control Board's Division of Drinking Water (DDW) established drinking water notification levels (NL) of 14 ppt for PFOA and 13 ppt for PFOS, and a combined PFOA/PFOS drinking water response level (RL) of 70 ppt. 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. Also, if a contaminant exceeds a RL, water systems are recommended to take the source out of service or provide treatment.

In March 2019, DDW 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. In August 2019, DDW lowered the NL to 5.1 ppt for PFOA and 6.5 ppt for PFOS based on its evaluation of recent human and animal toxicity data. DDW also has begun the process of establishing regulatory standards (i.e., maximum contaminant levels) for these chemicals.

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. On the average, 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 begun quarterly monitoring since spring 2019 per DDW's Order. PFAS were not detected in 2013 Zone 7's groundwater production wells sampling 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 able to monitor for more analytes: the 2013 PFAS monitoring included 6 chemicals and the latest monitoring was expanded to 18 chemicals.

In summary, seven production wells (three Chain-of-Lakes Wells, three Mocho Wells, and one Stoneridge Well) have tested above the NL for PFOS and four of these wells have also tested above the NL for PFOA. One of the wells, Mocho Well No. 1, has tested above the recommended RL of 70 ppt and is being blended or treated to levels below the RL at Zone 7's Mocho Groundwater Demineralization Plant (MGDP).

PFOA and PFOS are not detected in Zone 7 surface water supply sources. Although other PFAS have also been detected in Zone 7's water supply sources, at present there are no regulatory guidelines for these contaminants.

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 DDW, Zone 7 Board, Retailers, and Zone 7's direct customers of its monitoring results.
- Implemented procedures to reduce PFOA and PFOS below the RL in the delivered water from the Mocho Wellfield. Currently available treatment options for Zone 7 for reduction of PFOS include RO Membrane filtration and blending of water sources.
- Posted PFAS Information on the Zone 7 website.
- Conducting quarterly monitoring per DDW's Order.
- November 2018 – April 2019 PFAS monitoring results were included in the [2018 Consumer Confidence Report](#).
- Initiated an investigation to determine potential source(s) of contamination in the groundwater basin.
- Continue to monitor the regulatory and research developments related to PFAS.
- Continue to provide periodic update to the Zone 7 Board and customers.

Zone 7 Contact:

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Links to References:

[CA DDW PFAS website](#)

[EPA: Basic Information on PFAS](#)

[Center for Disease Control PFAS Factsheet](#)

[Agency for Toxic Substances and Disease Registry PFAS Factsheet](#)

[PFOA Stewardship Program](#)