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Perfluorooctane Sulfonate (PFOS) Fact Sheet

The Alaska Department of Health and Social Services Section of Epidemiology, created this fact sheet to address community concerns about the recent discovery of perfluorooctane sulfonate (PFOS) at the Regional Fire Training Center (RFTC) in Fairbanks, Alaska at 1710 30th Avenue and in water wells nearby.

PFOS is a perfluorinated chemical (PFC). PFCs are anthropogenic (made by humans) chemicals that have been used for both residential and industrial purposes. PFCs are found in some products that resist fire, stains, grease, and water such as furniture and carpets, clothing, firefighting foams, and food packaging. PFCs are very persistent in the environment and can travel long distances in water and air.

The City of Fairbanks is currently providing drinking water to area residents whose well water has tested positive for PFOS at levels higher than the federal health advisory level. This fact sheet aims to inform readers about the characteristics of PFOS and its health effects.

What is PFOS?

Perfluorooctane sulfonate (PFOS) is an anthropogenic (made by humans) chemical manufactured in the United States until 2002. PFOS was used primarily in firefighting foam and as a coating additive to provide stain repellent or fire resistant properties to clothing, upholstery, carpet and furniture.

How might I be exposed to PFOS?

PFOS is widespread and persistent in the environment. It has been found in small quantities in water around the world and can be found at low concentrations in food. It has also been found in the blood or tissues of various species of wildlife such as fish and marine mammals.

PFOS is commonly found in the US population. The 1999-2000 National Health and Nutrition Examination Survey (NHANES) conducted by the US Centers for Disease Control and Prevention, showed PFCs could be found in more than 99 percent of a sample of the U.S. population. This indicated a

widespread exposure of the population to PFCs during the decades leading up to the study. The follow-up NHANES study conducted in 2011-2012 showed a decrease in PFC levels measured in the blood of the US population, suggesting a decrease in the general exposure. The main PFOS exposure pathways are ingestion of food or water, and inhalation of dust particles contaminated with PFOS.

Because it used to be widely employed in the making of commonly used products such as fire or stain-resistant materials, children may be exposed to small doses of PFOS within the home by hand-to-mouth contact.

Accidental releases of PFOS in the environment -resulting in water or soil contamination - can be sources of higher than usual exposure for the local populations if no protective measures are taken.

How can PFOS affect my health?

Current research has not clearly shown that PFOS exposure is related to specific illnesses. Studies on people who work with PFCs (which include PFOS), who generally have higher blood PFC levels than the rest of the population, have not consistently shown that long-term exposure to PFCs is linked to health problems. Some recent studies in animals suggest that exposure to PFCs above certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or infants during breastfeeding. Other studies found associations between exposure to PFCs and liver, immune, thyroid, and other effects (e.g., cholesterol changes). However these associations need to be confirmed by additional research. Some human epidemiology studies on people exposed to a PFC called perfluorooctanoic acid (PFOA) have also shown associations with kidney and testicular cancers but other investigations showed no cancer risk.

At this time, the scientific evidence is insufficient to determine if long-term exposure to PFOS might cause any particular disease. Therefore, we cannot determine if drinking your well water would be the cause of current or future health problems. The U.S. Environmental Protection Agency (US EPA) is still evaluating whether PFCs can cause cancer in humans.

Has the federal government made recommendations to protect human health?

In May 2016, the US EPA established a health advisory level of 0.07 micrograms PFOS per liter of water ($\mu\text{g/L}$) (or, 70 nanograms PFOS per liter of water, ng/L) as a basis to assess the potential risk of short and long-term exposure through drinking water. This health advisory accounts for the exposure to PFOS from other sources as well. In addition, if PFOA is also present in water, then the sum of both concentrations of PFOS and PFOA cannot be greater than 0.07 ($\mu\text{g/L}$). The health advisory was developed to protect public health and was based on exposure of lactating women because of potential developmental effects

observed in toxicology studies of animals exposed to PFOS and PFOA. This health advisory was calculated to protect the most sensitive populations from the health effects of PFCs – fetuses and infants. Therefore, the health advisory is protective to other populations as well.

What is the Alaska Section of Epidemiology doing to address community concerns about exposure to PFOS in drinking water?

The Section of Epidemiology is working with the Alaska Department of Environmental Conservation (ADEC) and the Agency for Toxic Substances and Disease Registry to better understand the potential risks of exposure to PFOS from well water consumption by residents living near the RFTC. The Section of Epidemiology is exploring further steps to complement the body of data that was recently collected. The Section is also available as a resource for residents living near the RFTC to address any public-health related concerns and answer any health-related questions they may have.

Is it safe to shower, bathe or brush my teeth with my well water? And is it safe to swim in Peger Lake?

Yes. The potential risks of exposure from showering, bathing, or brushing your teeth are low because:

- PFOS is not significantly absorbed through the skin.
- PFOS is not easily transferred from water to air. This limits exposure by inhalation.
- Studies that tested the toxic effect of PFOS on animals show that PFOS is not a skin irritant, but that it can be mildly irritating to the eye. However, in these studies, the concentrations of PFOS were much larger than those that one could be exposed to while taking a shower, and therefore, are not relevant under residential conditions near the RFTC.

It is also safe to swim in Peger Lake for the same reasons mentioned above for bathing or showering with your well water. Concentrations of PFOS in water tested from Peger Lake are below the EPA health advisory level, therefore, accidental ingestion should not present an appreciable health risk.

Can my family or my pets drink my tap water?

If your test results are at or above EPA's health advisory level, the Section of Epidemiology recommends you do not drink your tap water or give it to your pets and other animals.

Can I clean my house, wash clothes, and rinse food with my well water?

Yes. Cleaning surfaces or clothes with well water will only result in a small PFOS residue.

Can I breastfeed my child if I have been exposed to my well water?

Exposure through breast milk can occur but studies show that PFOS levels in breast milk are much lower than they are in the mother's blood. Breastfeeding benefits are very well documented and mothers who

breastfeed are encouraged to keep doing so. The new EPA health advisory for PFOS was calculated to protect the health of breastfeeding women and their nursing babies. If PFOS levels are found to be above the health advisory in your water, we recommend breastfeeding mothers use an alternate drinking water source and continue to breastfeed.

Is it safe to cook with my well water?

PFOS is resistant to heat and is not volatile. Therefore, heating or boiling will not destroy or remove it from the water.

- If the PFOS level in your well water exceeds US EPA's health advisory level, it is not recommended to use the water for cooking.
- You can still use well water to boil eggs as this will not result in any significant exposure.

Is it safe to water my garden vegetables with my well water?

Yes. A study by the Minnesota Department of Health showed that plants watered with PFOS-contaminated water absorbed very little of the chemical. Overall, the study concluded that the health benefits from growing and eating homegrown produce greatly outweigh any potential risks from low PFOS concentrations.

How can I tell how much PFOS is in my body?

The half-life of PFOS in the body (the time it takes for half the amount of a chemical to leave the body if no additional exposure occurs) is about five to six years. PFOS can be measured in the blood; however, the test is not routine. The presence of PFOS in the blood may indicate that you have been exposed to PFOS; however, that does not mean you will suffer adverse health effects. The body's natural elimination processes are the only way to remove PFOS from the body. Currently, there is no set value for what level of PFOS in blood may increase an individual's risk for adverse health effects.

How often will you check the quality of the water in my well?

The City of Fairbanks is in the process of checking wells in the potentially affected area. Monitoring frequency of those wells will depend on the concentration of PFOS in the well and the reported water usage. Once the City of Fairbanks has that information it will work with the ADEC to establish a long-term monitoring plan for the impacted wells until a permanent alternative water source is set up.

Where can I find more information about PFOS?

- You can contact the Alaska Section of Epidemiology at 907-269-8000 for information on the health effects of PFOS.
- You can contact the Alaska Department of Environmental Conservation at 907-451-2153 for information on well water testing.

You can also find additional information on the following websites:

- Alaska Environmental Public Health Program: <http://dhss.alaska.gov/dph/Epi/eph/Pages/default.aspx>
- ATSDR's PFCs Toxicology Profile: <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=1116&tid=237>
- EPA's Fact Sheet on the PFOS and PFOA health advisories: https://www.epa.gov/sites/production/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf