PFAS – toxic chemical, hazardous to humans

PFAS is a serious environmental concern

Environmentalists have become increasingly concerned about a class of chemicals called perfluoroalkyl and polyfluoroalkyl substances, often abbreviated to PFAS. There are thousands of compounds, estimated over 5000, in the PFAS class. Individual substances have the names PFOA, PFOS, GenX, PFBS, plus there are many other names and substances.

PFAS persists in the environment and does not break down. These substances are difficult to dispose of.

What’s more, they can be found in human body tissue where they accumulate and are released from the body very slowly. Exposure to PFAS has been linked to kidney and testicular cancers, immune system issues, fertility problems, low infant birth weights, low growth rates in children, learning concerns, and increased cholesterol levels. Additionally PFOS has been linked to thyroid hormone disruption.

National Guard Base near Sioux City finds toxic PFAS chemical contaminating groundwater

Alarm bells rang in February, 2019, when the Air National Guard reported that PFAS, a toxic chemical that causes serious health problems in humans, had contaminated the groundwater near the base seven miles south of Sioux City. Although, the results were labeled as preliminary, the tests showed that the PFAS contamination had migrated off the National Guard base. Final results were published in March, 2019, confirming the initial announcement. The report indicated that the contamination most likely has moved off the guard base.

It was believed that the contamination came from firefighting foams (also called aqueous film-forming foam or AFFF) used at the base beginning in the late 1980’s. The National Guard replaced its fire suppression systems that use the PFAS chemicals in 2016.

PFAS was found in soil, sediment, surface water, and ground water, with some tests showing levels that could impact human health. One spot near the main hangar had more than 123 times the recommended level for drinking water, testing at 8,610 parts per trillion. Six out of eight ground water tests and one of two surface water tests were above the recommended drinking water limit of 70 parts per trillion. The Guard and the Iowa Department of Natural Resources (DNR) are continuing work and remedial investigations of the contamination.

Within a mile of the guard base, there are 189 private wells. The DNR requested that 12 private wells south and west of the base be tested for PFAS contamination; also the DNR also requested that the Southbridge collector well owned by the city of Sioux City be tested. Testing which was completed in 2019 found no detectable levels of PFAS or found levels below the drinking water health advisory.

PFAS-contaminated groundwater found on Des Moines National Guard Base

Groundwater testing at the National Guard base in Des Moines showed PFAS levels 200 times the recommended drinking water limit of 70 parts per trillion. Current tests performed on the Guard base in Des Moines hinted that a plume of contamination may be moving off the base property. The Iowa Department of Natural Resources requested further testing.
Des Moines Water Works performed additional sampling and testing of the public drinking water supply. The drinking water supply entering the treatment facility showed no contamination. They did find stormwater runoff from the airport site was carrying PFAS into the alluvium where the Water Works was drawing water.

**PFAS found in Des Moines Waterworks finished water**

Late March, 2021, the Des Moines Water Works found PFOS in its finished drinking water at the level of 6.5 parts per trillion which is within the guideline. The Water Works is going to continue testing the water for PFAS chemicals.

**PFAS found in well near Cedar Rapids airport**

On April 1, 2021, David Cwiertny who is the director of the Center for Health Effects of Environmental Contamination of the University of Iowa reported that the Center had detected a well with high levels of PFAS. The family using the well was provided with reverse osmosis system which is expected to protect the drinking water.

**Uses of PFAS compounds**

PFAS chemicals are resistant to water, oil, grease, and heat.

These chemicals have been used as fire retardants, in non-stick cookware (such as Teflon), on stain-resistant clothing (such as Goretex) and fabrics (including Scotchgard-protected fabrics), carpets (such as Stainmaster), umbrellas, tents, in food packaging, in cleaning products, in polishes and waxes, in paint, in insulation for wiring, and in fire-suppressing foams. The fire-suppressing foams are used at military installations, fire training centers, airports, and some manufacturing facilities. Some industries, such as chrome plating, electronics manufacturing, and oil recovery use PFAS compounds.

A 2021 study lead by Heather D. Whitehead found that PFAS chemicals were widely used in cosmetics sold in the United States and Canada. Of the 231 products tested, fluorine, an indicator of PFAS, was found in:

- 56% of foundations and eye products
- 48% of lip products
- 62% of long-lasting lipstick
- 47% mascaras
- 82% of waterproof mascara

EPA reports that food can become contaminated if it is grown in soil or water contaminated with PFAS, if it comes into contact with PFAS during the manufacturing and handling process, and if it is packaged in materials containing PFAS. Some pizza boxes contain PFAS, as well as microwave popcorn bags and fast-food wrappers.

Although PFAS manufacturing companies have agreed to phase out manufacturing of some of the compounds (PFOA and PFOS), the products are still produced internationally and can legally be imported into the United States.

**Regulatory Framework**

The United States Environmental Protection Agency (EPA) published a guidance that states the drinking water level for PFAS should not exceed 70 parts per trillion in order to protect human health. These are considered voluntary guidelines. EPA has begun a process to set enforceable standards, a maximum contaminate level, for PFAS through the Fifth Unregulated Contaminant Monitoring Rule.

In light of how dangerous the PFAS chemicals are, some states have undertaken efforts to test water bodies for PFAS, including New Jersey. Some have set their own regulations.

During the 2019 Iowa legislative session, Representative Charles Isenhart introduced a bill – HF775 – that would prohibit the manufacturing, distribution, and sale of consumer products containing PFAS chemicals. The bill prohibited the sale of upholstered furniture containing flame-retardant chemicals, as well as the sale of food packaging,
the sale of fire-fighting foam, and the sale of fire-fighting personal protective equipment containing PFAS compounds. The Iowa legislature did not pass the bill.

Recommendations

1. The Iowa Department of Natural Resources should undertake a PFAS testing program involving water, sediments, and fish tissue and concentrating on waterbodies near airports and places used for fire training exercises. The Iowa Department of Natural Resources conducted tests on 57 public water systems between 2013 and 2015 and found no contamination by the six chemicals that they tested.
2. Testing of water from private wells should include a test for PFAS, particularly if the wells are close to airports and fire training centers.
3. Public water sources near airports, military bases, fire training exercise areas, and areas where PFAS foams have been used to extinguish fires should be regularly tested for PFAS contamination.
4. Fire departments should eliminate the use of PFAS foams.
5. Fire departments should replace their supply of fire-suppression chemicals with fluorine-free foams (those not containing PFAS compounds).
6. Sewage sludge (biosolids) should be tested for PFAS chemicals. Any sewage sludge testing positive for PFAS should not be applied to land.

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