

Fluorinated carbons, PFAS, found in nearly half of US tap water

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The results of a new study released last week by the US Geological Survey (USGS), a bureau of the US Department of the Interior, found that nearly half of all US tap water contain industry-made perfluoroalkyl and polyfluoroalkyl substances (PFAS), referred to as “forever chemicals” due to their stable molecular structures that make them highly persistent in the environment. Some PFAS may take over 1,000 years to degrade, if at all.

These synthetic substances, first developed during the Manhattan Project (the US government research project that produced the first atomic bomb) in 1945, are known for their heat-resistant and stain-resistant properties, and have become ubiquitous in the commercial fabric of society that include a wide range of consumer products, food packaging, nonstick cookware, waterproof clothing and firefighting foams. Because of their unique carbon-fluorine bond—one of the strongest chemical bonds in nature—they persist in the environment after seeping into the groundwater from landfills, wastewater treatment plants, waste incineration facilities and contaminated rain.

Research has documented the health effects of these substances for more than five decades. It includes potential for causing cancers, behavioral disturbances, metabolic derangements, and impact on pregnancy and childhood development.

As the 2015 Madrid Statement on PFAS made clear, “[They] are found in the indoor and outdoor environments, wildlife, and human tissue and bodily fluids all over the globe. They are emitted via industrial processes and military and firefighting operations, and they migrate out of consumer products into the air, household dust, food, soil, ground, and surface water, and make their way into drinking water.”

The statement added that in addition to the toxicity seen in animal studies that led to liver toxicity (PFAS is known to accumulate in this organ), deleterious impact on lipid and endocrine metabolism, immune dysregulation, formation of tumors in multiple organs, “the growing body of epidemiological evidence ... include[s] association with testicular and kidney cancers, liver malfunction, hypothyroidism, high cholesterol, lower birth weights and size, obesity, decreased immune response to vaccines, and reduced hormone levels and delayed puberty.”

Extrapolating from samples collected from 716 tap water locations—residences, businesses and drinking water treatment plants, including 155 unregulated private-well water—throughout the country over a five-year period (2016-2021), the USGS study

estimated that about 45 percent of US drinking waters contained anywhere from one to nine different PFAS with corresponding cumulative concentrations ranging from 0.348 to 346 parts per trillion (PPT), with a median figure of seven PPT.

These substances appeared to predominate in urban areas clustering in the Great Plains, Great Lakes, Eastern Seaboard, and Central and Southern California regions with high population densities. However, as the authors note, only a few dozen PFAS were targeted in the study despite, according to industry experts, the existence of 14,000 such compounds used in every conceivable facet of production.

The authors of the USGS report wrote, “Targeted PFAS analytes are only a fractional indicator of the 8000+ potential PFAS and the fraction of total organic fluorine captured by these targeted analyses is typically low in surface water and drinking water. Potential detection of one or more PFAS in US drinking-water combined with the paucity of information available on current use of ultra-short chain compounds supports the continued need for point-of-use tap water monitoring, with an emphasis on small community water supplies.”

They conclude by warning, “To fully understand exposure and adequately determine risk to human health, continued emphasis should be placed on 1) integrating geospatial datasets with PFAS data broadly to identify vulnerable regions/subpopulations, 2) expanding monitoring to include rural small-system and private-well dependent communities, and 3) expanding target and non-target analysis methods particularly in drinking-water monitoring programs in the US and globally.”

Although the US Environmental Protection Agency (EPA) sets the standards for drinking water quality, each state can interpret these standards, including “nature of the regulation and the state’s view on which level may result in health effects,” should they choose to, with the caveat that there is a wide range of PFAS concentrations.

For example, while California has the strictest limit, PFAS concentrations of 5.1 PPT, in Nevada the allowed concentration is the highest in the country at 667,000 PPT. Recent estimates have placed the number of Americans drinking PFAS-contaminated water of at least 1 PPT at 200 million people. When researchers adjusted their exposure limit to 10 PPT, they still found that 20 to 80 million Americans were exposed to such levels. Blood tests indicate that upwards of 98 percent of the US population has been exposed to PFAS.

Although most states had adopted the EPA's previous level of 70 PPT, in March 2023, under mounting pressure from public health scientists and various interest groups, the EPA revised the legal limits on two compounds commonly produced and in use for several decades, per-fluoro-octane-sulfonic acid (PFOS) and per-fluoro-octanoic-acid (PFOA) to 4 PPT which is understood by experts on the topic as an arbitrary compromise.

Scientists have emphatically stated that there are no safe limits for exposure to these compounds and recommended "advisory health limits" that are 50 to 1,000 times lower than even this threshold. Additionally, they further criticized the EPA and Biden administration because these new limits only apply to six out of about 14,000 compounds and called for the entire class of chemicals to be regulated.

This didn't stop the chemical industry and military from taking the EPA to task on this shift stating that the enforcement of such measures is liable to set off a wave of lawsuits. Chemical manufacturer 3M, which recently reached a \$10.3 billion settlement for PFAS contamination of US public drinking water systems, a drop in the bucket to be paid out over 13 years, said after the EPA's announcement of the new limits, "We believe that the standards proposed by the EPA lack a sound scientific basis and that the EPA has not shown that they are necessary to protect public health or the environment."

The statement is technically correct insofar as it references the lack of any effort by the EPA, the White House, and the entire governmental apparatus to address these issues up to the present moment. The White House Office of Science and Technology Policy wrote in March 2023, "An inherent complexity to PFAS is the limited understanding of where PFAS is present in products, including where PFAS is intentionally added and where it is present as a byproduct of other processes."

They admitted, "Understanding the sources and pathways of exposure is critical to mitigation of PFAS ... Mitigation efforts and health-protective measures cannot be implemented without the ability to detect PFAS at levels of concern. Addressing the challenge of developing additional analytical methods with higher sensitivity to detect both single and mixtures of PFAS is a critical opportunity to accelerate advancement across all other areas."

Considering these comments indicate little has been done so far to address the concerns first raised about the environmental costs and public health dangers more than two decades ago, the Biden administration's recent proposal to protect communities from PFAS pollution are just hollow promises functioning as reelection campaign talking points rather than giving serious consideration to the health of the population.

Indeed, the Obama-Biden administration back in 2011, through the EPA, allowed extraction industries to employ highly toxic chemicals in the fracking process that break down into fluorocarbons, PFAS. The *New York Times* wrote then, "The records, obtained under the Freedom of Information Act by a nonprofit group, Physicians for Social Responsibility, are among the first public indications that PFAS, long-lasting compounds also known as 'forever chemicals,' may be present in the fluids used during drilling and hydraulic fracturing, or fracking."

The EPA scientists had themselves indicated the potential

toxicity of these chemicals, but the Obama administration allowed these same companies to invoke trade-secret claims that meant information on these chemicals could be withheld from the public. This policy further raise critical issues over the role of the EPA as a supposed public health defender while acting as an agent of Wall Street. With thousands of chemicals constantly being introduced into commercial use, there is very little testing to comprehend the long-term consequences they pose to environmental and population health.

Notably, 3M, a multi-billion-dollar conglomerate operating in numerous industrial fields, which began production of PFOA in 1947, had noted signs of trouble in their workers exposed to high levels of these chemicals back in the 1980s and 1990s. Specifically at their Teflon factory in Parkersburg, West Virginia, a cluster of birth defects was possibly linked to PFOA. Their own internal documents had found these chemicals in fish and recognized their toxic potential. In 1990, they examined blood levels in their workers and how exposure was altering their cholesterol levels.

Much of this information was suppressed or minimized until recently. And, in response to two decades of lawsuits, 3M has curtailed production of PFAS beginning in 2020 and will halt all PFAS production by the end of 2025. However, the long-term clean-up and health issues that are expected to emerge in the future decades will be at the expense of the working-class population.

Regarding healthcare alone and the enormous costs to remove these pollutants, a 2019 study conducted by the Nordic Council of Ministers on health impacts linked to exposure to PFAS, estimated the costs to the European Union at 52 to 84 billion euros annually. Extrapolating this data for the US, this would translate to \$37 to \$59 billion each year. These costs would be deflected by the polluters and ultimately borne by "ordinary people, health care providers, and taxpayers."

The issue of PFAS and its regulations is but the tip of the iceberg that is bringing the issues of pollution, climate change and global sustainability of this planet to the fore. The very conditions that have allowed pandemics to emerge as a real existential threat to humanity are a byproduct of the anachronism of capitalist production that places profits over the safety of human life and environment. However, given the experiences with the failed and criminal response to the COVID pandemic, there is no viable solution under the aegis of capitalist production.

Fundamentally, the only path forward in addressing the crisis of human survival are the principles espoused by scientific socialism, which places at the fore the rational organization of all human endeavors, including the protection of the very resources that make life possible. Scientific discoveries are critical and necessary but must be tempered by their usefulness on one hand and potential hazards on the other.



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