Australian study reveals extent of PFAS contamination in Sydney drinking water

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A recent study of drinking water across Greater Sydney, Australia's most populous city, by scientists at the University of NSW (UNSW) detected widespread contamination with toxic PFAS (per- and poly-fluoroalkyl substances).

The scientists looked for 50 known PFAS compounds and found 31 in the drinking water samples, 21 of which were previously undocumented in Australia.

PFAS are called "forever chemicals" because they do not break down in the environment and accumulate in biological organisms. They are used in many everyday household items including non-stick cooking implements, make-up, greaseproof paper and waterproofing.

The study of 32 water samples, taken in 2024 from taps in the Ryde, Prospect, North Richmond and Potts Hill catchment areas, was conducted by Lisa Hua and Professor William Donald from the UNSW School of Chemistry, and published last month in Science Direct's *Chemosphere* journal.

Professor Donald said: "Sydney's water meets current Australian standards, but when considering health benchmarks used in other countries, some samples were near or above safety limits.

"Detecting PFAS not previously reported in tap water highlights that our monitoring programs are now uncovering more of the chemicals present in our supply."

The compound found in the highest concentration on average, and detected in every sample, was PFBA, a short-chain (4 carbon molecules) PFAS that is increasingly used in manufacturing as a supposedly safer replacement for banned or tightly regulated long-chain (8 carbon molecules) PFAS. The researchers noted that some studies have indicated potential impacts of PFBA on liver, thyroid, and developmental health.

The scientists also studied both local and internationally sourced bottled water, detecting 50 different PFAS compounds, more than all other studies of bottled water since 2008, with the exception of another Australian study, conducted last year.

Similarly, of 39 studies internationally to detect PFAS presence in tap water since 2006, the latest study also revealed the highest number of PFAS compounds.

One of these, 6:2 diPAP (a fluorophosphoric acid diester), has never previously been found in tap water anywhere in the world. Another, 3:3 FTCA (fluorotelomer carboxylic acid), has only been detected once before, and never in Australia.

According to the study, "6:2 diPAP was detected in 75 percent of samples and quantified in 69 percent of samples with an average concentration of 1.3 ppt."

6:2 diPAP is a member of a short-chain group of PFAS known as PAPs (polyfluoroalkyl phosphate esters).

Professor Donald noted that each of the PFAS detected were chemically quite similar which presented problems for regulation. He noted: "Tiny tweaks to the chemical structure create a 'new' compound, but the toxicology research and regulatory work has to start all over again every time a PFAS is tweaked."

At the time of the federal government's Select Committee on PFAS late last year, there were 99 PFAS chemicals on the Australian Industrial Chemicals Introduction Scheme register which had not been tested.

Early studies point to short-chain PAPs causing endocrine disruption, liver damage, kidney and testicular cancer, and reproductive toxicity. A major concern among researchers about this body of chemicals is that biotransformation, a process through

which a chemical compound changes once it enters an organism, combined with bioaccumulation—a buildup of chemicals in an organism—could impact biological systems in ways that are not yet known.

This research casts a shadow of doubt over the increasing use of PAPs as a supposedly safer substitute for long-chain PFAS, some of which are known to cause cancer.

In 2023, the International Agency for Research on Cancer classified long-chain PFOA (perfluorooctanoic acid) and PFOS (perfluorooctane sulfonate) as Class 1 and Class 2A carcinogens respectively. PFOA and PFOS were most widely used in the manufacture of teflon, and in firefighting foam (aqueous film forming foams, AFFFs).

The UNSW study found PFOS in concentrations of 6 parts per trillion (ppt) in samples from the North Richmond area. This is higher than the US limit of 4 ppt, but below the new voluntary Australian guidelines of 8 ppt—a figure set by National Health and Medical Research Council (NHMRC) in June this year, but not enforceable on any regulatory body.

Richmond is home to a Royal Australian Air Force base, where firefighting foam containing PFAS was used in exercises until 2004, causing ongoing contamination of the surrounding area and waterways.

The UNSW research follows the discovery of high levels of PFAS in Blue Mountains drinking water last year. The likely source of PFAS contamination in the Medlow and Greaves Creek Dams was the use of AFFF to extinguish a petrol tanker fire in 1992. Independent testing conducted by Ian Wright from Western Sydney University exposed a decades-long cover-up by water utilities and state and federal governments of the ubiquity of PFAS contamination.

Official testing on Blue Mountains tap water by Sydney Water found the level of PFOS at 16.4 ppt—more than twice the Australian guidelines and four times the US limit.

Pleas from Blue Mountains residents for free PFAS blood tests, which are not covered under Medicare and cost $500 a test, have been rejected by the NSW Labor government. At least 27 Blue Mountains residents who have paid for the blood tests themselves have recorded the "highest levels of PFAS of any civilian population in Australia," according to the *Sydney Morning Herald*.

The official indifference to the poisoning of the water supply and the health implications of high PFAS readings in residents' blood, is in stark contrast to the recommendations of scientists.

The US National Academies of Sciences, Engineering, and Medicine advised the Centres for Disease Control in 2022 to "update its clinical guidance to advise clinicians to offer PFAS blood testing to patients who are likely to have a history of elevated exposure, such as those with occupational exposures or those who live in areas known to be contaminated."

But NSW Health's "Expert Advisory Panel on PFAS" rejected this in July, declaring: "The National Academies of Science Engineering and Medicine (NASEM) blood levels are not appropriate to guide clinical management. … At present, there is no clinical benefit for an individual to have a blood test for PFAS."

The state health authority's anti-scientific position is a blatant attempt to downplay an environmental and health crisis that would cost governments billions of dollars to address and cut across the profits of the corporations that manufacture and use PFAS chemicals. This underscores that the scourge of PFAS contamination of drinking water cannot be ended through appeals to capitalist governments or their organs.

To eliminate the increasingly ubiquitous toxic "forever chemicals" and provide a clean, safe water supply for all will require the coordination of vast resources, science and technology. This is incompatible with a political and economic system in which human health, lives and the environment are subordinated to the demands of the wealthy elite for ever-growing profits.

The health of humanity will be decided by the working class in the struggle for socialism and the permanent overthrow of capitalism.