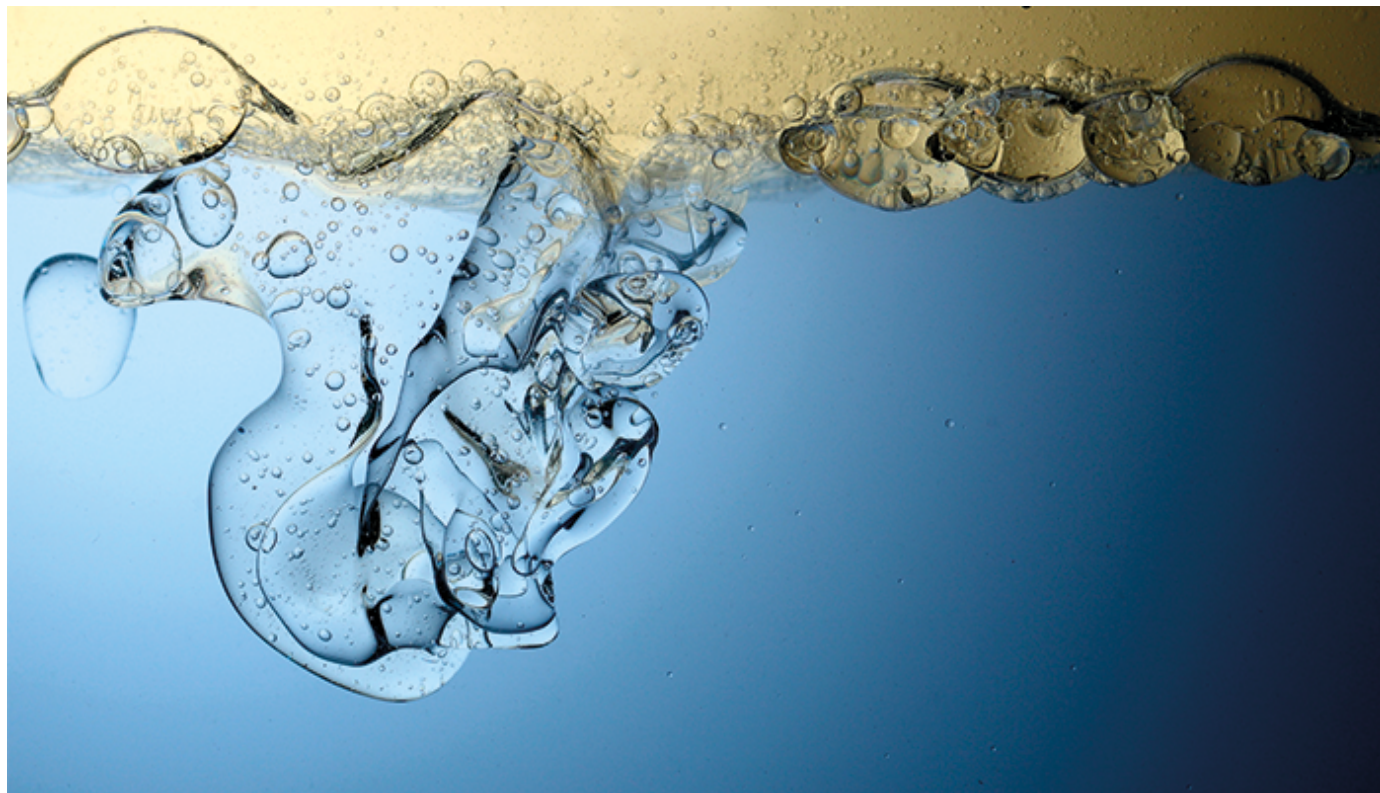


# Over the limit

30 May 2019

Dr Ian Ross and James Lemon examine the regulations and guidance attempting to deal with poly- and perfluoroalkyl pollution



Poly- and perfluoroalkyl substances (PFAS) are a broad group of several thousand manmade chemicals that were first developed in the 1940s. The properties of these chemicals include thermal stability and the ability to repel both oil and water, meaning they have been widely used in industrial and consumer applications such as textiles coatings and firefighting foams.

The widespread use of PFAS during the past 70 years has led to large-scale releases into the environment from sources such as firefighting training areas, wastewater treatment plants, metal plating operations and landfill sites. Once released, PFAS are extremely persistent and show significant bioaccumulation in humans. They are mobile in water and can create large plumes in surface and groundwaters, which can impact drinking water supply wells, food and beverage manufacture, and crop irrigation.

## Regulatory change

PFAS are classed as emerging contaminants, and prior regulatory focus has been on two individual compounds: perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). However, an expanding range of other PFAS, such as perfluorohexane sulfonic acid (PFHxS) are now being regulated in some countries.

The international response was 2009's Stockholm Convention on Persistent Organic Pollutants, which led to restrictions on PFOS production. PFOA and PFHxS are also under review for inclusion. However, this does not address the fact that these pollutants have already been released into the environment, and only one PFAS of thousands has been officially restricted. Source areas, such as firefighting training areas, are likely to leach PFAS for decades.

An increasing understanding of PFAS' toxicity and persistency, and a recognition that a major route of public exposure is via contaminated drinking water, has led to regulators globally reviewing national drinking water standards. Underlying the regulatory changes are diminishing acceptable daily exposure levels for the general population, known as Tolerable Daily Intakes (TDIs). In May 2016, based on new TDIs, the United States Environmental Protection Agency (USEPA) issued an updated long-term exposure health advisory limit for drinking water of 70ng/L (parts per trillion) for PFOS and PFOA combined. Australia matched this for PFOS in April 2017, and included additional PFAS.

Public concern regarding these substances has rapidly increased. In 2016, the detection of PFAS in drinking water in the US, combined with the revised USEPA assessments, led to 6.5 million people's drinking water being considered unsafe to drink. Patrick Breyse, director of the Center for Disease Control and Prevention's National Centre for Environmental Health, described PFAS as "one of the most seminal public health challenges for the next decades".

In the UK, Drinking Water Inspectorate (DWI) guidance sets a multi-tiered approach that restricts PFOS and PFOA concentrations to 1,000ng/L and 5,000ng/L respectively, with a trigger to consult and monitor at 300ng/L. These triggers are based on TDIs set by the European Food Safety Agency (EFSA) in 2008. However, in December 2018, EFSA published revised tolerable weekly intake (TWI) levels for PFOS and PFOA. These new TWIs represents a 99.9% decrease for PFOA and a

99% decrease for PFOS compared to the 2008 TDIs. If the DWI reviews its standards in light of the new EFSA TWIs, it could generate UK drinking water criteria of 12.6ng/L for PFOS and 5.6ng/L for PFOA.

Limited publicly available information suggests PFAS are distributed widely in UK groundwaters, surface waters and some drinking water, and there may be human exposure in the UK that is above drinking water standards. Given the public concerns and regulations seen in multiple countries in recent years, and the new EFSA TWIs, further research and resources in the UK should be focused on this potentially emerging public health concern.

**Dr Ian Ross** and **James Lemon**, CEnv MIEMA are senior technical director and principal consultant at design and consultancy firm Arcadis.

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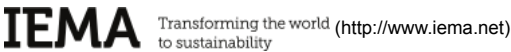
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