EurEau

Briefing Note

Moving Forward on PMT and vPvM Substances

1. Introduction

The purpose of this paper is to demonstrate the impact of persistent, mobile and toxic (PMT) and very persistent, very mobile (vPvM) substances on water services. We will describe possible regulatory approaches to restrict their use.

Drinking water suppliers have been raising concerns about these substances for many years and EurEau echoed them in the public consultation as part of the REACH evaluation.

By virtue of the growing body of evidence and research surrounding these substances that pose a great risk to water sources, **EurEau advises the European institutions that more must be done to close the knowledge and regulatory gaps, in order to prohibit the continued release of PMT and vPvM substances into the environment**. Their inherent characteristics – mobility and persistence – mean they can be in waters far from where they entered the system as they can travel without degrading, and in turn contaminate water resources, impacting humans, animals and plants.

Clear instruments within chemical legislation will allow us to address short-chain per- and polyfluoroalkyl substances in our water sources, as they are among the chemicals to most likely to be found. These chemicals need more monitoring as not enough is known about them; however, we know they are a real threat to water quality. For this reason, industry must promptly assess their substances for persistent, mobile and toxic properties. However, if this effort is inadequate, competent authorities should utilise the mechanisms under the REACH Regulation to restrict their manufacturing, import and use.

Examples provided in this briefing's annexes help to elucidate the extensive effects and costs these chemicals, and their longer chain compounds, have had on the environment and human health both within and outside of Europe. The resulting regulatory reactions come in various forms reflecting the individual situation. The common denominator is the realisation that more needs to be done to tackle the growing problem.

2. What are PMT and vPvM Substances?

In recent years there has been growing concern regarding substances discovered within drinking water sources that have displayed persistent, mobile, toxic (PMT) characteristics, or substances that may be very persistent and very mobile (vPvM). Lacking a common general description, these substances are defined by their inability to break down under environmental conditions, their affinity for water, and, when toxic, their adverse impacts to human health and the environment. The concept of 'mobility' is not yet covered by REACH. Several European countries have, thus, investigated many substances registered in REACH and the Stockholm Convention. They have derived a list of suspected substances that demonstrate PMT or vPvM properties and have created parameters under which to identify them, using many of the parameters set out in existing regulations.

3. Why are PMT and vPvM Substances Problematic for Drinking Water Supply?

The compound's mobility is due to their high polarity causing them to be very soluble in water and to display very little adsorption to nonpolar surfaces. In combination with their resistance to microbiological and chemical degradation, they easily pass through barriers, making their removal through drinking water treatment ineffective by existing methods.

Water suppliers facing contamination of their drinking water resources can either shift to alternative, non-contaminated sources or invest in treatment technologies, both of which are expensive.

The success of activated carbon (AC) filtration, for instance, relies on pronounced hydrophobic interactions between the AC and the pollutant. Therefore, AC-filtration is usually not a promising treatment technique for the management of highly polar substances. Similarly, ozonation has demonstrably been rejected by polar compounds. Reverse osmosis and nanofiltration, alternatively, have proven to be effective barriers against most polar compounds.

Placing the burden of removing these substances from drinking water resources on water suppliers is unsustainable. Primarily, these processes do not in fact destroy the chemicals, but instead create much waste (brine) – approximately 25% of treated water[1] – that requires separate treatment. This adds to its energy-intensive nature, which would involve re-mineralising the water prior to supplying it to consumers. **EurEau estimates the cost for reverse osmosis, specifically, would raise the price of water treatment by more than €1/m³ equalling circa €200 added to the water bill for the average household per year**. Not least to mention, the end product is artificial water, contrary to the natural ground- and spring water that many consumers in the EU are accustomed to enjoying.

[1] T. Reemtsma, U. Berger, H. Peter Arp, H. Gallard, T.P. Knepper, M. Neumann, J. Benito Quintana, & P. De Voogt, Mind the Gap: Persistent and Mobile Organic Compounds – Water Contaminants That Slip Through. Environmental Science and Technology 2016, 50, 10308-10315.

High pressure membrane filtration processes for the production of drinking water would, lastly, only address one possible pathway of exposure. Once PMT and vPvM substances enter the environment they can become a real threat to water bodies. It would not account for constant human exposure through air and food.

Annex I presents three examples of drinking water resources contaminated by one group of suspected PMT substances, per- and polyfluoroalkyl substances (PFAS).

Short-Chain Per- and Polyfluoroalkyl Substances

Among the substances most likely to display PMT and vPvM properties, short-chain per- and polyfluoroalkyl substances (PFAS) are increasingly a subject of international discussion. They primarily exhibit persistence comparable to their long-chain analogues. In the same way, their carbon-fluorine bond does not enable them to undergo abiotic or biotic degradation under normal environmental conditions, with many precursor compounds that break down into these highly stable substances.

The toxicity of short-chain PFAS (SC-PFAS) is largely unknown, especially regarding the long-term effects. They appear to be less toxic than long-chain perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) but the available data is insufficient for a final evaluation. Some research has, however, shown they are able to bind to proteins in blood and tissue, which is presumably of toxicological significance. Likewise, other research has begun to indicate their health effects can include reproductive, developmental and systemic toxicity, as well as impact to the liver and kidneys. Nevertheless, some short-chain PFAS are, in fact, known to concentrate in plants – through water in soil – more than PFOS, meaning exposure to humans and herbivores could result through crops and edible plants.

The distinctive element of concern, however, is their physicochemical properties allowing them high aqueous solubility. This makes water bodies, including drinking water resources, susceptible to contamination. Complementary to their hydrophilic nature, their very low sorption potential causes these substances not to bind to other particles letting them remain in the water phase unable to be removed from the environment with conventional water treatment methods. These combined traits, alongside their persistence, mean SC-PFAS possess the capability of long-range transport already having been found in remote areas, such as Arctic waters.

What is certain so far is that new short-chain alternatives to the long-chain PFAS are continuously being developed [2]. Data regarding the identity, functioning and emissions of these chemicals are rarely published or made publicly available. The lack of information makes it difficult to adequately assess and manage the risks they are likely to pose. In addition, there is an urgent need to assess risks related to possible metabolites and cocktail effects.

This adds to the challenges resulting from the gaps in existing chemicals legislation. **The primary challenge is the tendency for substances to be regulated on a**

[2] OECD, 2013. OECD/UNEP Global PFC Group, Synthesis Paper on Per- and Polyfluorinated Chemicals (PFCs). Environment, Health and Safety, Environment Directorate, OECD, Paris, France. <http://www.oecd.org/env/ehs/risk-management/PFC_FINAL-Web.pdf>.

one-to-one basis, as opposed to by class. Thus, approximately 5,000 PFAS have been placed on the market unhindered, and despite their similar properties and behaviour – i.e. persistence in the environment – short-chain PFAS have been permitted as safe substitutes. As they are believed not to possess the same bioaccumulative potential as long-chains and their level of toxicity remains inconclusive, addressing their associated concern proves difficult. For this reason, the concept of PMT provides an opportunity to close the gap.

It is therefore important to implement a more general solution in the long term. **The effects of the emissions of these chemical substances on water quality and drinking water resources should have a more prominent position in REACH.** The current REACH guidance explicitly takes into account the risks introduced by indirect exposure of humans via the environment through consumption of food, drinking water and inhalation of air, which in turn are directly influenced by the releases of substances into the environmental compartments of air, water and soil. In view of this, EurEau advocates for an adjustment of this risk characterisation, so that it also comprises a general assessment of the effects of releases on water quality – especially if relevant to drinking water resources – and on the possibility to achieve the goals of the Water Framework Directive and the proposed requirements of the future Drinking Water Directive.

4. Taking Action

Article 7.3 of the Water Framework Directive states, "Member States shall ensure the necessary protection for the bodies of water identified with the aim of avoiding deterioration in their quality in order to reduce the level of purification treatment required in the production of drinking water". In order to do this the legislative tools ought to facilitate adequate prevention, monitoring and disciplinary measures to safeguard against chemical pollutants entering water sources. Below highlights the prevailing European chemical regulatory framework with a focus on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and the Classification, Labelling and Packaging (CLP) regulations.

REACH

The REACH regulation was adopted in order to improve the protection of human health and the environment from the risks that can be posed by chemicals. It applies to all chemical substances, not only those used in industrial processes but also in day-to-day products, such as paints, articles of clothing, furniture and electrical appliances.

REACH places the burden of proof on companies who must identify and manage the risks linked to the substances they manufacture and market in the EU. They have to demonstrate to the European Chemicals Agency (ECHA) how the substance can be safely used, and they must communicate the risk management measures to the users.

If the risks cannot be managed, authorities can restrict the use of substances in different ways. In the long run, the most hazardous substances should be substituted with less dangerous ones.

Under the regulation, tools and pathways exist to, primarily, collect information regarding the use and presence of chemicals on the market. Filling gaps in data better enables success in regulating and restricting these harmful substances.

Community Rolling Action Plan

A mechanism for such data collection in identifying hazardous substances under REACH is the Community Rolling Action Plan (CoRAP). ECHA and the Member States develop risk-based criteria on which substances are selected for the CoRAP list. Member States also contribute to its development by proposing substances for inclusion. Once on the list, ECHA is responsible for coordinating the substance evaluation process relying on the Competent Authorities of Member States.

If, after review of the available and new data, the evaluating Member State considers that the use of the substance poses a risk, it may then proceed with follow-up actions to substance evaluation. Included in these actions are the options to identify the substance as a substance of high very concern, or to restrict the substance altogether.

Substances of Very High Concern

With sufficient data, **the proposal to identify a substance as a substance of very high concern (SVHC) is the commencement of the authorisation process.** Classifying a substance as an SVHC aims to ensure that they are progressively replaced by less dangerous substances or technologies.

Among the criteria to decide whether a chemical is a SVHC are substances which are persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB) according to REACH Annex XIII; or substances on a case-by-case basis, that cause an equivalent level of concern as PBT/vPvB substances as noted under Article 57.f.

Restriction

Another means of controlling hazardous chemicals is offered by Article 67.1. of REACH. The article states, "[a] substance on its own, in a preparation or in an article, for which Annex XVII contains a restriction shall not be manufactured, placed on the market or used unless it complies with the conditions of that restriction". This limits or bans the manufacture, placing on the market or use of a substance, both, originating within and imported to the EU.

At the request of the European Commission, a Member State or the ECHA can start the restriction process for substances suspected of threatening human health or the environment. Alternatively, **ECHA can propose restrictions on articles containing substances on the Authorisation List.**

Proposals must justify the restriction and include information on alternatives, costs, and the benefits resulting from a restriction.

The European Commission then provides a draft decision on the opinions of ECHA's two committees of Risk Assessment (RAC) and Socio-Economic Analysis (SEAC), after which it is scrutinized in comitology to take a final decision. **Once a substance is restricted, industry is obligated to comply – manufacturers, importers, distributors, downstream users, etc. – and Member States are responsible for enforcement.**

Having a group restriction on short-chain PFAS, for instance, would not be unusual. Entry 50 of Annex XVII is a restriction of polycyclic aromatic hydrocarbons, which for the moment covers eight of such chemicals. It is acknowledged, however, that justifying the harm of every short-chain PFAS and their precursors is impracticable.

Classification, Labelling and Packaging Regulation

A complementary measure could be the Classification, Labelling and Packaging Regulation (CLP), which adopts most of the criteria from the United Nations Globally Harmonised System of Classification and Labelling of Chemicals (GHS), while still including features from the previous European legislation represented by the Dangerous Substance Directive (DSD) and the Dangerous Preparations Directive (DPD). The regulation is legally binding across Member States and applicable across all sectors.

The CLP aims to identify whether a substance or mixture possesses intrinsic properties requiring a hazardous classification. Concluding a substance or mixture is hazardous triggers obligations of classifying, labelling and packaging for manufactures, importers, downstream users and distributors, as well as producers and importers of articles. One such obligation is hazard communication to actors up and down the supply chain including consumers.

As it stands, the class of environmental hazards covers the aquatic environment with five categories, of which four are for chronic toxicity. The four categories only account for behaviour displaying the inability to degrade rapidly and the potential to bioaccumulate, but does not consider the property of mobility. However, chronic category 4 provides some flexibility as it is described as a 'safety net' classification in the event that there are grounds for concern but insufficient data available to fulfil the formal criteria regarding a substance or mixture.

Despite the benefits of communicating hazardous classifications, it is not immediately apparent how it would contribute towards preventing the emission of PMT or vPvM substances. Much would be left to the goodwill of companies to decide substitute such chemicals if prohibitive measures are absent.

5. The Way Forward

The combined properties of high solubility and protein-binding, challenges the present assessments designed to determine bioaccumulative potential which are based on either bioconcentration in aquatic species or Kow coefficients[3]. Yet, for the thousands of PFAS on the market and possibly in the environment, the inability to satisfy bioaccumulation as defined by regulatory frameworks does not remove the risks associated to ongoing and elevated exposure.

At Present

Given the novelty of the subject, a number of studies have been recently produced to better quantitatively define the parameters of mobility in order to target specific chemicals. Currently, there have been various substances registered under REACH and the Stockholm Convention that have been identified as potentially PMT or vPvM utilising the measurements established by these studies[4].

Admittedly, greater information regarding chemicals is required to accurately implement PMT assessment and to develop more suitable analytical techniques for water monitoring. In this way, countries that have shown leadership in addressing the concern of these substances (e.g. Denmark Germany, Norway, and The Netherlands) urge industry to voluntarily track and assess REACH registered substances against PMT and vPvM criteria so to close data gaps.

These countries envisage that in the event voluntary action proves insufficient, mechanisms under REACH could be implemented to, at least, force the collection of information with the possibility to affect the use of these substances.

One example, where regulatory steps were taken, is the June 2019 decision of ECHA's Member State Committee to identify GenX-related chemicals as substances of very high concern (SVHC). Remarkably, this was the first time that chemicals have been proposed as SVHCs, based on their mobility and persistence in the environment, which was considered as an equivalent level of concern to CMR, PBT and vPvB substances.

Similarly, **Norway has submitted their intention to ECHA to designate perfluorobutane sulfonic acid (PFBS) – a short-chain PFAS – as an SVHC under Annex XV of REACH for its equivalent level of concern as stated in Article 57(f).** Both in Norway's Risk Management Option Analysis (RMOA) and their commissioned report on PFBS, the persistent and mobile character of the substance alongside its unpredictable long-term consequences to human health and the environment were highlighted as reason for special attention. **Their dossier to ECHA on PFBS is anticipated for August 05, 2019.**

Subsequently, a restriction under REACH on similar chemicals would be the

[3] Wang Z et al. A Never-Ending Story of Per- and Polyfluoroalkyl Substances (PFAS)? Environ. Sci. Technol. 2017, 51, 2508-2518.
[4] Hans Peter Arp (2018), "Technical Note: Preliminary Assessment of Substances Registered under REACH that could fulfil the Proposed PMT/vPvM Criteria". Norwegian Geotechnical Institute, DOC No. 20160426-TN-01.

envisaged course of action. A restriction would ensure protection from the emission of substances, demonstrating PMT and vPvM properties, into water resources and the larger environment. However with PFAS substances on the global market numbering in the thousands, efforts need to be made to regulate the group as a whole.

EurEau notes with satisfaction that the Environment Council of 26 May 2019 urged the Commission to develop an action plan to eliminate all non-essential uses of PFAS[5].

More generally, EurEau fully supports the concomitant actions of further investigating chemicals that may be classified as PMT or vPvM through the CoRAP, in addition to setting substances on the path to authorisation by submissions as SVHCs, with the ultimate aim of restriction. Fortifying criteria to close information gaps regarding the presence of these substances, including PFAS, will better safeguard water quality and drinking water resources.

In remembering industry's responsibility to ensure the safe use of chemicals and to maintain updated registrant dossiers, **we call on authorities to put in place legislative requirements for companies to assess their registered chemicals for PMT and vPvM properties should they prove an unwillingness to do so voluntarily and rapidly.** Better detection of these substances will help to prevent the furthering of their persistence and contamination in water sources, as well as to find adequate source control and downstream solutions.

In Future

We also reiterate our position for better use of REACH. As the regulation is instrumental to controlling hazardous substances from entering the water cycle, **we continue to believe that the process ought to be used more frequently and in a stringent way to regularly identify SVHCs against emerging concerns such as PMT and vPvM criteria.** As outlined above, end-of-pipe treatment is not sustainable. For protection of the aquatic environment and human health, **the standards stipulating equivalent level of concern ought to be updated to include mobility under Article 57.** This would encompass the burgeoning number of chemicals that pose a threat and are not covered under the prevailing criteria. Current benchmarks only account for substances that accumulate within the food chain and are hydrophobic, yet do not monitor for those that are hydrophilic and accumulate in water with equal probability of having adverse effects.

As stipulated in Article 191.2 of the Treaty of the European Union, we advocate the 'Precautionary Principle' and the principle of 'control at source' as the best means for protection by, *inter alia*, keeping anthropogenic substances away from water bodies and preventing emissions at the origin. Control-at-source measures are crucial to mitigating preventable emissions of hazardous chemicals into the environment. The

[5] https://www.consilium.europa.eu/media/40042/st10713-en19.pdf

burden placed on the drinking water industry – and consequently on the consumer's water bill – to remove these substances is unviable. It would be costly requiring the constant search and development for technologies of removal that cannot keep pace with the rate at which new chemicals are being created, making such technology not readily available at large scales and often ineffective.

As such, the use of short-chain PFAS, in particular, is foreseen to increase as alternatives to the long-chain compounds. In the absence of a proactive and holistic approach to understanding and classifying the threats posed by these chemicals, there is a risk of creating a bigger problem in the future for which few solutions exist.

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Annex I

The country examples below demonstrate the pervasive issues caused by replacing long-chain PFAS with short-chain substitutes. Many companies have switched their production to short-chain chemicals, yet they seldom provide public information on which fluorochemicals are produced and at which locations. Two of the three anecdotes also elucidate the burdens borne by local governments and consumers for the contamination caused by polluters. The Nordic Council's 2019 report is the reference document for most parts of the following examples and can be found here.

The Netherlands

In 2012, the PFAS manufacturer Dupont replaced long-chain PFAS production with the short-chain GenX at their Chemours plant in Dordrecht. While GenX may be less bioaccumulative than its long-chain analogue PFOA, it is more mobile, equally persistent, and reports filed by Dupont with the USEPA indicated that the replacement chemical may cause some of the same health problems. GenX from the chemical plant was discharged into the sewer system of the city of Dordrecht. As the waste water treatment plant was unable to remove it from waste water, it was released into the Lower Merwede River. From there it moved to rivers further downstream that act as the drinking water resource for a number of drinking water suppliers in the region. Due to GenX being highly persistent and mobile, neither river bank filtration nor drinking water treatment removed it from the raw water. Its discovery in drinking water provoked a public scandal.

Given the chemicals properties, Chemours was required to reduce GenX emissions from 6,400 kg/year to 2,000 kg/year. In September 2018, the company announced it would invest €75 million in reducing emissions of GenX and organic fluorinated substances, by installing active carbon filters and other technical solutions which are expected to eventually remove up to 99% of the targeted substances.

Italy

A large-scale contamination of PFAS was discovered in the Veneto Region of Italy in 2013, directly affecting groundwater, surface water, drinking water and land in an area of over 200km². The chemical company Miteni claims that production of PFOS and PFOA stopped in 2011, but their product catalogue still includes PFHxS and PHxSF. Monitoring data collected between 2013 and 2015 identified the following specific long- and short-chain compounds: PFBA, PFBS, PFDA, PFDoDA, PFHpA, PFHxA, PFHxS, PFNA, PFPeA and PFUnDA. The highest combined concentration levels of PFAS found in groundwater samples amounted to 60.000 ng/l and those found in the distribution system amounted to 1214 ng/l.

One pathway of contamination was through the plant cooling water emitted from the chemical factory directly into a creek and the surrounding groundwater. The second pathway was from the wastewater plant to a canal that drained into the surface waters of the Fratta-Gorzone river.

Authorities installed activated carbon filters in drinking water treatment plants, which were estimated to cost €2 million, and was paid for by the Veneto Region's government and taxpayers. An additional cost of €4.3 million went to a surveillance plan. Maintaining the carbon filters also incurs cost, estimated at €900,000 per annum. This results in an increase of €0.066-€0.21 per m³ of water for consumers versus €0.04-€0.085 had there been no PFAS pollution.

Moreover, in November 2017, the costs that had been already borne by the Veneto Environment Agency (ARPAV) to cope with the PFAS emergency over the 2013 - 2017 period amounted to € 3.5 million[6]. However, further estimated costs, by ARPAV (2017), included health-related aspects at €100 million, for creating new connections to different drinking water networks worth €260 million, and interventions related to agriculture another €200 million.[7] At the same time, the government announced €80 million to be allocated for the construction of the first part of a new aqueduct[8].

Furthermore, the local water operator Acque del Chiampo has spent €2.8 million[9] on activated carbon filters up to 2018, laboratory activities and enhancement of the water supply network. An investment program is anticipated for the year 2019 and post 2021 for additional €6.1 million[10].

Sweden

In Sweden, 2003, aqueous film-forming foams begun to comprise of a new type of PFAS. A 2013 groundwater quality survey detected high concentration of both long- and short-chain PFAS in the Bredåkra delta (Ronneby). The source of the contamination was identified as the fire drill site located in the nearby military airport. Although the water source had a carbon filtering system to reduce the contamination of the drinking water, their effectiveness was hampered once they became saturated.

To secure drinking water supply, new pipes were built between 2013 and 2015 to provide Brantafors, one of the municipal waterworks, with uncontaminated water from the Karlsnäs area. The cost of changing the water supply from Brantafors to Karlsnäs is roughly estimated to have cost Ronneby municipality €5.8 million. The additional annual cost for increased monitoring is calculated to be around €4,800.

The Swedish Chemical Agency (KEMI) and the National Food Agency set up a national PFAS network which brings together a wide range of stakeholders to advance existing knowledge on the issue. A national monitoring exercise of PFAS in the environment compiled around 6,000 measurements of surface and groundwater. Significant water resources remain unusable, nonetheless, for an unforeseeable future due to PFAS contamination. This loss, however, has not been monetised.

[6] Massimo Mazzola 2017, l'Inquinamento da Sostanze Perfluoroalchiliche (PFAS in Veneto. Dipartimento Regionale Sicurezza del Territorio. AssoARPA. Available at: http://www.assoarpa.it/wp-content/uploads/2017/11/MAZZOLA.pdf.
[7] *Ibid*.
[8] *Ibid*.
[9] Acque del Chiampo S.p.A (2018).
[10] Acque del Chiampo S.p.A (2019).

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Annex II

On the international level, the concerns surrounding the pervasiveness of PFAS have begun to make headway prompting legislative action in a number of countries. Below, we present two such examples.

The United States

Washington State's Toxics in Packaging Law (Chapter 70.95G RCW) has put a ban on PFAS in food contact material. PFAS in food contact material (FCM) is defined in the legislation as a "class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom" (section 70.95G.010, para.5). The ban comes into effect January 2022 with the identification of safer alternatives (section 70.95G.070). As such, the State is the process of conducting Alternative Assessments.

The New York State Senate passed Bill S439 on January 9, 2019 related to PFAS chemicals in firefighting activities. The define PFAS chemicals similar to that of Washington State, in which they are "a class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom". Among the prohibitions are:

The use of PFAS-containing class B firefighting foams for training purposes;

- The sale or distribution of PFAS-containing class B firefighting foams as of January 2021 (with the exception to oil refineries and chemical plants);
- Manufacturers of PFAS firefighting foam are to recall the product and reimburse purchasers prior to the ban entering in effect and;
- Requires buyers to be notified if being sold personal protective equipment containing PFAS.

The state of California's Department of Toxic Substances Control has put forth a proposal to regulate the class of PFAS within carpets and rugs on the list of Priority Products under the Safer Consumer Product Regulations. Their justification is to address the potential long-term sources of widespread human and ecological exposures to the hazard traits of PFAS chemicals.

In addition to these states, others have also enacted legislation to ban PFAS in firefighting foam, food contact material and other items. The non-profit coalition called Safer States has monitored these developments across the country and their work on PFAS can be found here.

Australia

Both the South Australia and Queensland state governments have put in place legislation to prohibit the use of PFOS and PFOA. For Queensland, particularly, the Precautionary Principle in conjunction with growing evidence of the harms of both long-chain and short-chain PFAS formed the premise for their policy on the Environmental Management of Firefighting Foam.

Under this policy, by July 7 2019 all PFOA-containing foams must be taken out of service or replaces. Similarly, PFOA, its precursors and higher homologues must be replaced by fluorine-free alternatives or ≤C6 short-chain PFAS. However, the foam would need to be fully contained without discharging into the environment.

Most recently, the Australian Parliament put forth a report recommending a nation-wide ban on long-chain PFAS firefighting foam (PFOA, PFOS, PFHxS). This comes in response to widespread contamination of water supplies across the country.

About EurEau

EurEau is the voice of Europe's water sector. We represent drinking water and waste water operators from 29 countries in Europe, from both the private and the public sectors.

Our members are 32 national associations of water services. At EurEau, we bring national water professionals together to agree European water sector positions regarding the management of water quality, resource efficiency and access to water for Europe's citizens and businesses. The EurEau secretariat is based in Brussels.

With a direct employment of around 476,000 people, the European water sector makes a significant contribution to the European economy.