

# International conference: PFAS – Dealing with contaminants of emerging concern

30 November & 1 December 2020

## [Conference report \(longer version\)](#)

As part of the German EU Council Presidency, the German Federal Ministry for the Environment (BMU) and the German Federal Environment Agency (UBA) hosted the international online conference *PFAS – Dealing with contaminants of emerging concern*. Over 700 participants from 30 countries tuned into the live stream – with 300 to 450 people simultaneously logged in. This conference on the environmental impacts of per- and polyfluoroalkyl substances (PFAS) was one of the largest online conferences held by the BMU during Germany's EU Council Presidency. The great interest and positive feedback from the conference confirmed that this is a highly topical and sensitive subject.

The aim of the international conference was to offer a platform to outline current regulatory developments of the substance group, discuss strategies for dealing with PFAS contaminations, present possibilities for soil and water remediation and future political action areas, for instance, to minimise PFAS discharges into the environment. Urgently needed technical matters and issues relevant to enforcement were also discussed. The conference brought together two different specialists groups from the fields of chemical risk assessment and contaminated site management..

Due to their unique properties, PFAS are used in a broad range of products such as outdoor clothing, cooking utensils, stain-resistant rugs and fire-fighting foams. The downside of the widespread use of PFAS is their stability ('forever chemicals'), which means that they can accumulate in the environment and enter the food chain. Worldwide, even in 'untouched' regions, PFAS have been found in water bodies, soils and living organisms. PFAS can have impacts on human health, which may include a reduction in the effectiveness of vaccinations, increased likelihood of infection, higher cholesterol levels and lower birth weight in newborns.

The event was jointly opened by Dr Dube, Director-General for Water Management and Resource Conservation at the BMU, and Professor Dr Messner, President of the Federal Environment Agency (UBA). In her welcome address, Dr Dube underlined that more and more scientific findings are verifying the downside of using this group of substances and making clear that they pose a serious risk to humans and the environment. That is why the EU and Germany are advancing PFAS research and the development of policy strategies, legal requirements and remediation techniques. Precautionary measures are clearly the best way to protect the environment and us all.

Professor Messner emphasised that PFAS should only be used where absolutely essential, and in such cases only until an alternative is found. He pointed out the considerable need for research and that UBA is working, also in European networks, on obtaining new findings on this group of substances, and from an extensive monitoring, to draw up measures for protecting human health and ecosystems. UBA recently published a brochure on PFAS that provides comprehensive information on the current state of knowledge.

The American chemist, author and environmental activist Arlene Blum was the keynote speaker at the international PFAS conference. She is the founder of the Green Science Policy Institute, which produces

scientific studies and engages in political activities that have contributed to a ban on harmful chemicals in everyday products. In her speech, Arlene Blum explained that of the groups of chemicals harmful to human health, she estimates PFAS to be the most dangerous due to their persistence and difficulties associated with remediation. The Green Science Policy Institute has taken on the task of combatting these harmful chemicals. Arlene Blum welcomed European efforts to comprehensively regulate and limit the use of this entire group. The mindset has also changed in the US which was partially triggered by the Hollywood film “Dark Waters” that deals with PFAS environmental pollution in the US by the chemical company DuPont. In addition, the new US President Joe Biden prioritised PFAS regulations in his *plan for environmental justice*.



*Image 1 A sneak peek behind the scenes — considerable technical effort and professional technology. Picture S.Neulen*

The presentations during the conference made clear that new discoveries of PFAS contaminations of soil and groundwater are made continuously. More and more studies show that PFAS, which are used in numerous everyday products for their water-, fat- and stain-resistant properties, are a serious threat to humans and the environment. Soil and water contaminated with PFAS also pose a risk to human health because the substances will inevitably leach into drinking water and the food chain. Two years ago, the European Food Safety Authority (EFSA) drastically lowered the threshold for the tolerable weekly intake (TWI) of the most significant PFAS, reducing it a thousandfold. EFSA lowered the threshold once again very recently. Professor Tanja Schwerdtle, Vice President of the German Federal Institute for Risk Assessment (BfR), outlined the reasons behind this decision and how intake levels are derived. Professor Schwerdtle chairs the working group “PFAS in food” at EFSA. The outcome of the latest scientific assessment was a sum value of 4.4 nanogrammes per kilogramme of bodyweight per week for four PFAS in human blood (PFOA, PFOS, PFHxS, PFNA). These four compounds account for the largest share of the contamination detected. Professor Schwerdtle explained that, in particular, the effects of PFAS on the immune system and the observed exceedance of critical blood values in a large proportion of the population were decisive factors in the EFSA assessments.

The European Commission is increasingly advocating far-reaching regulatory measures on PFAS. It published its Chemicals Strategy for Sustainability in October 2020, which contains a PFAS Action Plan that Cristina de Avila, Head of the Sustainable Chemicals Unit at DG Environment presented during the

conference. One of the most significant initiatives in the strategy is the restriction of the manufacturing and use of the entire group of substances. Exceptions are only to be made for uses that are essential for society. In future, PFAS are to be addressed with a group approach in all relevant legislation on water, sustainable products, food, industrial emissions and waste. The Commission also wants to develop an EU-wide approach to the remediation of PFAS contamination and provide financial support for innovative research projects with a view to the necessary substitution of PFAS with environmentally sound chemicals. The restriction and substitution of PFAS are also declared objectives of the European Parliament and the Council.

Ms Aust from UBA talked about the restriction proposal under REACH, which is drawn up by the German chemicals authorities together with the authorities of four other countries (the Netherlands, Denmark, Norway and Sweden). It will regulate all uses of the entire PFAS group of substances that are not essential for society. Banning individual compounds would be ineffective for a dynamic group of substances with several thousand compounds and would not help protect the environment. A proposal is to be submitted to the European Chemicals Agency ECHA in 2022, thus formally initiating the EU restriction process. As this is a very complex process, a decision is not expected before 2024.

Following the reports on the current regulations and activities at EU level, the conference's second block of presentations focussed on the national approach to this issue in Europe and Australia. Various strategies and measures to remediate PFAS contamination of soils and groundwater were presented during this segment. Griet van Gestel from the Flemish authority responsible for soil and waste (OVAM) and Arjen Wintersen from the Dutch National Institute for Public Health and the Environment (RIVM) outlined their approach to deriving background levels for PFOS and PFOA (OVAM also for PFBA), risk assessment and dealing with excavated soil contaminated with PFAS. In addition, the guidelines for Flanders published by OVAM in 2020 set out PFAS thresholds for soils, excavated soils, soil additives and sediments as well as target values for soil remediation. *"No improvements without standards!"*

While in Flanders and the Netherlands only a small percentage of PFAS contaminated soil needs to be treated or landfilled, Karen Marie Haug and Vanja Alling from the Norwegian Environment Agency (NEA) reported that in view of PFAS-contaminated civilian airports, Norway is building special landfills for this excavated soil. Although PFAS in fire-fighting foams have been banned in Norway for 10 years (PFOS for 20 years), the NEA in some cases detected very high levels of PFAS contamination in the soil, groundwater and surface water and in fish in a study conducted in 2018 at all Norwegian civilian airports. The goal now is to remediate 2 airfields per year (14 by 2027). Prioritisation will be determined by a cost-benefit analysis in conjunction with local risk of drinking water contaminations.

Nicola Powell from the Australian Department of Agriculture, Water and the Environment reported that fire-fighting foams are also the leading cause of PFAS contamination of soil and groundwater in Australia. In 2016, the Australian Department of Agriculture, Water and Environment and the states and territories set up a PFAS Task Force. The Task Force develops regulations for dealing with contaminations, initiates national programmes and coordinates, advises and supports local authorities and stakeholders. The National PFAS Environmental Management Plan also includes advising the PFAS producing and processing industry to switch to using non-toxic chemicals. The third version of this plan is due to be published in 2021.

The last two presentations on the first day of the conference focussed on areas with extensive PFAS contamination. The presenters were Dr Paolo Ronco and Gisella Pitter from Centro RIVE, the Centre for Water Resources of Veneto (Italy), and Katja Stolzenberg-Hepp and Dr Gabriel Striegel from the PFAS

Unit of the Karlsruhe district administration (Germany). Here, it was shown that PFAS contaminations can have causes other than the use of fire-fighting foams. They also underlined the complexity of the problem and the challenges local enforcement authorities face, in particular if requirements are not laid down by law. In the Veneto region, a PFAS production company and the textile processing industry contaminated an area of around 600 km<sup>2</sup>, affecting 30 municipalities and 140,000 inhabitants. In the Rastatt region it was found that PFAS-contaminated paper sludge had likely been deposited on agricultural land for many years. Large contaminated groundwater plumes formed as a result of the permeable aquifer in the Rhine valley. Contamination continues to spread even further through the plumes. Other areas were also contaminated through the extraction of the contaminated water for agricultural irrigation.

Tests carried out in Veneto on people from the affected region revealed an average PFOA concentration of 44.4 ng/ml blood plasma. By comparison – the HBM II value of the Human Biomonitoring Commission of the Federal Environment Agency, above which adverse health effects are possible, is 10 ng/ml. Furthermore, a correlation was found between the levels of PFAS in blood, and cholesterol levels and blood pressure.

To supply the population with potable water, 11 million m<sup>3</sup> of drinking water is purified with activated carbon every year. Replacing the activated carbon alone costs around 1 million euros per year. Similar to all the other examples presented during the conference, this is financed using public funds. Attempts to enforce the polluter-pays principle are often unsuccessful.

New findings on the spread of contaminant plumes in Veneto are expected shortly (under the EU funded LIFE Phoenix Programme).

The treatment of drinking water with activated carbon and reverse osmosis is also essential in Rastatt (Germany) to safeguard drinking water quality. Precursors are particularly problematic in this region as they are a persistent source of long- and short-chain PFAS. Because of the size of the area concerned, remediation is at best an option for individual hot spots. In Rastatt, the focus is therefore on safeguarding drinking water supply and monitoring agricultural products. Scientific studies have determined which crops absorb comparably low levels of PFAS depending on the soil type. Farmers are advised individually and plants are tested for PFAS two weeks before harvesting. This has helped maintain buyers' confidence in local products.

The second day of the conference (third block of presentations) centred on the current state of the art of science and technology regarding available remediation options with presentations from Australia and Germany. Dr Thomas Held from Arcadis introduced the recently published guide commissioned by UBA *Remediation management for local and widespread PFAS contaminations*. Professor Ravi Naidu from the University of Newcastle, Australia then gave a brief overview of innovative remediation concepts and technologies available internationally. The lively discussion that followed made clear:

- (1) where there is still a need to take action
- (2) that there is practically no proportionate remediation solution available for extensive contamination
- (3) that the costs of measures are consistently a bottleneck for the swift implementation of measures

In two moderated panel discussions, the speakers shared and discussed current positions, research priorities, latest findings and developments, the vision of the European Chemicals Strategy as well as

national- and network-specific and international plans for research-based and appropriate activities and solutions.

The first discussion centred on current PFAS findings and resulting strategies developed from the perspective of European networks. The representatives articulated their positions, outlined their demands, suggested suitable solutions to the European Commission and offered their constructive cooperation.

The key demands were:

- The establishment of reliable risk assessment instruments based on the latest human and ecotoxicological basic data, reliable measurement data and verified methods of analysis
- Biomonitoring studies to predict harmful or adverse effects on potential receptors
- The development of technically feasible, effective and proportionate remediation measures for possible contamination scenarios and location conditions, taking relevant interfaces with environmental law into account
- Harmonisation of European and national regulatory approaches to soil, water, waste and waste water
- The use of the EU Green Deal to finance concrete research activities

A lively discussion ensued on the review of political approaches and implementation options.

Draft guidelines for the nationally uniform assessment of PFAS contamination of soil and water in Germany were also presented. These are intended as an enforcement aid for local authorities and to provide them with information on the problem. The guidelines also contain recommendations for action and include information on suitable analytical detection methods such as sum parameters.



Image 2: Annegret Biegel-Engler and Jörg Frauenstein (UBA) in discussion with Claudia Olazabal (DG Environment, EC), Dietmar Müller-Grabherr (General Secretary to COMMON FORUM on Contaminated Land), Johan De Fraye (Chair of NICOLE), Carmen Casado (SedNet Steering Group) and Professor Volker Birke (PerFluSan research network); Picture: D. Wenz

The second round of discussions then turned to the future and participants debated whether PFAS could serve as a blueprint for emerging pollutants. One of the lessons we have learned from PFAS is that environmental policy should not just react, but must also take preventive actions. Although the assessment of chemicals under REACH is on the right track in Europe, conclusive data is often lacking to reliably determine the environmental impacts of substances or mixtures and their dissemination into the environment. For instance, REACH does not contain any options for remediation as the regulation assumes that companies use their chemicals safely and thus that their use cannot pose a risk to humans or the environment. Authorities, the research community, but also the public are called on to scientifically examine, understand and ask inconvenient questions.

The conference highlighted the enormous interest of different groups in PFAS and that we can learn a great deal from one another. A key to the future may therefore be to not only consolidate this interdisciplinary dialogue, but also to translate it into closer cooperation.



*Image 3: (Top from left to right) Annegret Biegel-Engler (UBA), Xenia Trier (EEA), Arlene Blum (Green Science Policy Institute, US) (bottom from left to right) Cristina de Avila (DG ENV – Chemicals (EC)), Tatiana Santos (EEB), Johan Ceenaeme EmConSoil (BE) Picture: D. Wenz*