UK PFAS Workshop April 2021 – Meeting Output

Per and polyfluoroalkyl substances (PFAS) are a large group of >9,000 chemicals that are used in many different applications, due to their useful intrinsic properties (e.g. grease resistance, water repellence). However, PFAS are also persistent chemicals and some have demonstrated a range of negative consequences for human health and the environment. There are certain PFAS under EU REACH regulations that have been recognised as Substances of Very High Concern (SVHC) and there are currently two that have been identified as Persistent Organic Pollutants (POPs), PFOA and PFOS.

The UK PFAS workshop, run by DEFRA, aimed to:

- Share current thinking on assessing and addressing the PFAS problem
- Share completed, ongoing and future work
- Build stakeholder engagement
- Gain stakeholder views on key PFAS issues
- Act as a starting point for, potential, future engagement activities

The workshop took place over two days and comprised a range of delegates and presenters including government, industry, academics and NGOs.

This document provides the presentation slides from across the two days, a summary of the Q&A sessions and collated responses from discussion in breakout groups.

Day 1 presentations	
Morning – What is the concern?	The diversity of PFAS
	PFAS levels in the environment
	What do we know about the public health risks?
	NGO and industry perspectives
Afternoon – What do we know about UK sources?	Assessing the potential PFAS legacy
	Water industry chemical investigations
	EA evaluations of REACH-registered PFAS used in the UK

Day 2 presentations	
Morning – Addressing the concern	Global perspectives on PFAS risk management
	Overview of proposed EU approach
	Consideration of possible grouping approaches and essential uses
Afternoon – Where do we go from here?	What do we want to achieve?
	Product stewardship

Summary of Q&A and comments for presentations

Please note that the workshop was conducted under Chatham House Rules. No names have been used without prior consent.

The diversity of PFAS

If we agree that PFAS definition is a very broad one covering a wide universe of substances with different physical, chemical, environmental, and biological properties should we reassess the definition or agree to have sub-groups?
This is a political question of how you might want to regulate PFAS. Some say to regulate based on persistence alone, which is the route the EU is going down. Others disagree and say it is too precautionary and there is no basis for going down such a route of a broad restriction. Other ways of doing it is making sub-groups based on bioaccumulation or toxicity etc. There are many ways to sub-group PFAS. There may be some regulatory PFAS definition that is less broad than the chemical definition because that may be too broad.

PFAS levels in the environment

Do you think your (EA) monitoring network, which has been so useful for PFOS and PFOA, will be drastically reduced under the planned move to the Sentinel and Agile networks?
It will be different; there is a step change in terms of how we monitor and how we design the programme. We are moving to a different way of monitoring and selecting sample sites. Two components to that, Sentinel component, which will be a new long-term surveillance network and complimented by Agile, the more targeted risk-based monitoring. There is a step-change in difference, and this will take time for the data to be justified to be comparable. The thinking of moving to the surveillance network under Sentinel is that it will produce a more robust dataset. It is designed around a GRTS system (Generalised Random Tessellation Stratified) - randomised, but representative panel of sites that are to be selected to be sampled and that panel may rotate across several years. With the surveillance network, there is one component within that Sentinel system – part of a much larger natural capital assessment tool. Evidence will be drawn from a wide variety of sources to build a picture.

There is an image of a sea bird in the presentation, are they also monitored for PFAS?
The seabird represents the predatory bird monitoring scheme (PBMS) - there is a recent paper describing trends in levels of FAS in gannet eggs. Here is a link to the paper: https://www.sciencedirect.com/science/article/pii/S0048969720354292

What do we know about the public health risks?

The implication is that PFAS in food packaging is only used in specialist packaging (e.g. moisture and grease resistance) and applies to a small portion of the market. Is that correct?
Manufacturers retain the option to use PFAS in food packaging. If they do it must be ensured that it meets the necessary legislative requirements for food contact materials, and it does not lead to a health risk in its expected use. There is some evidence to suggest that manufacturers are moving away from the use of PFAS in food packaging. We understand that where it is used, it is predominately to give packaging a specific technical requirement, for example in microwavable popcorn bags

Do you know how much food contact packaging is made in the UK and how much is imported with the treatment applied elsewhere? Is there the same generalisation on moving away from PFAS apply to imported packaging?

The trade association for the UK paper and board industry, Confederation of Paper Industries (CPI), questioned its members in relation to any potential use of PFAS chemicals (including both per- and poly- variants) in the manufacture of paper and board products. The vast majority (99%+) of paper packaging manufactured in the UK by CPI member companies does not use PFAS of any sort. It should be noted that CPI were only able to comment on behalf of its member companies who manufacture in the UK only. It does not represent the entire UK paper and board industry. Other organisations would need to comment for paper products outside its membership and beyond the borders of the UK. Many BPIF carton members that supply board for conversion and eventual placement on the UK market have provided declarations confirming that they do not use fluorinated substances in their products.

The food contact legislative requirements for placing on the market of imported products are the same as those that are produced by businesses within the UK.

NGO and industry perspectives

NGO perspective:

Does CHEM Trust have a position on essential uses?

CHEM Trust is part of the UK Chemical Stakeholder Forum and within that there is a working group on the essential use concept, where there are various representatives and stakeholders. We are exploring that concept together; sharing our views, discussing, and identifying areas of consensus and where there are areas of divergence. The EU is also developing their thinking on the essential use concept. So, we have been also following the discussion at CARACAL.

Does CHEM Trust have a view on the legacy remediation of PFAS pollution already out there? Should we and can we clean up existing environmental pollution?

Legacy has to be discussed and the first step is to identify the key contamination sites. Remediation is very costly and there is a question of what you do with the waste, whether it is soil contaminated or the water, but this does need investigating. There needs to be a plan to move forward and to identify the sites, key sites that need urgent remediation to lower the exposure to local population and wildlife. We should clean up existing environmental pollution, but the question remains about who would pay for this. Regarding the methodology to clean-up, it depends on what it is that needs the cleaning. There is a lot of methodology being developed for remediation on water and soil contamination, but it is challenging with the shorter chain, more mobile PFAS.

Are there areas of convergence or divergence between Fidra and CHEMTrust on what has just been presented, or with how we should be managing PFAS?

Fidra is very much aligned with CHEMTrust. What we have been doing is working with retailers and looking for voluntary action, but that does not stop the need for legislative ban of non-essential uses. This is a way to try and make things move quicker, legislation and policy can take time, and things can be done in the interim. Very much aligned with the same messages that CHEMTrust are giving.

Industry perspective:

Can you elaborate on relevance of fluoropolymers to Sustainable Development Goals and the Green Deal?
Looking at the Sustainable Development Goals of energy, some fluoropolymers get used in generation of hydrogen and fuel cells, these are harsh chemical conditions so there would be a requirement or need to have something durable or persistent to be able to survive in these environments. We mentioned earlier about Covid-19 supports the need for fluoropolymers in medical applications – whether it be from the refrigeration to keep vaccines cool or electronics in critical equipment.
See: Home :: Fluoropolymers - Plastics Europe

What about lifecycle issues? Many PFAS emitted during manufacture and what happens to fluoropolymers at end of life?
We would encourage anyone to be responsible for end of life of any substance, fluoropolymers are challenging. Very small amounts are used in many applications and recycling of the fluoropolymer is often not practical, but there some technology out there and we would recommend incineration at high temperature, and you end up with converting the fluorine back to HF, which is removed by a calcium salt to make calcium fluoride, which goes back to the original fluoride starting material.

What about the manufacturing aspect?
We do what we can to contain any emissions we have, there will always be some emissions, but at AGCCE we have abatement technology for air and water. Emissions collected from that can either be recycled or incinerated.

There are issues around some of the plants and the people who live near the plants are concerned about the PFAS contamination, even in some of the replacement substances like HFPO-DA, there are different alternatives made by the different manufacturers and these are emitted and being measured at multiple sites. We do not know the toxicological profile of a lot of the substances that are being produced, is there not a concern there over the more substances on the market that we do not know about? Are there efforts underway to work out better ways of making fluoropolymers as you don't need to use some of the low molecular weight fluorinating emulsifiers during polymerisation.
We do not use GEN-X for manufacture in the UK. As an industry we are working together to try and working out how we can further improve our processes. It is very challenging to make some types of fluoropolymers without a fluorinated polymerisation aid, but research is ongoing by all the main producers globally. There have been some fluoropolymers you can make without them, granular PTFE and does not need a fluorinated polymerisation aid. The dispersion type polymerisations are much harder to produce, but research is ongoing.
We have assessed polymerisation without fluorinated polymerisation aids in the past and research is still ongoing, however, there have been some significant drawbacks with regards to performance properties of fluoropolymers made by those methods. Process efficiency issues making it technically and commercially not feasible, at this stage. Example of product performance issues, there was the less stress resistance of fluoropolymers which is very important for many different challenging applications in our daily lives. This feeds to premature efficiencies which generates more waste.

Do you how many fluoropolymers that are made in China that are on the UK market?
AGCCE does not import fluoropolymers from China. We are aware that some Chinese manufacturers are still using PFOA, but we do not have any details to comment further on that.

There are very few high temp incinerators in UK and household products do not go to these. Do we need separate collections of household goods with PFAS in?
We would not consider fluoropolymers as hazardous waste. For some household applications such as cookware there are alternatives, so would agree that would not be essential use, it is more of a convenience use. There will be a few milligrams of PTFE on a non-stick frying pan, therefore, it is better we recycle the metal from the frying pan at a centre that is of a sufficiently high temperature to burn off the PFAS and convert it to HF (and be appropriately scrubbed). If there is a chemical that is a hazardous waste then this should be segregated, but fluoropolymers are not classified as hazardous waste.

Do you have any thoughts on transparency from producers on products in use including manufacturing aids? And the recent example of the copyright challenge to Wellington providing a reference standard for a producer compound.
We are not aware of the details of the Wellington case, but our polymerisation aids and chemicals we use are EU and UK REACH registered and so the information is available, and the Environment Agency will be providing a presentation on some of our substances being evaluated, we are transparent in what we are using and how we are using it.

Do we know anything about the contribution of fluoropolymers to 'microplastics'?
The number of fluoropolymers produced is many orders of magnitude less than polyolefin-based plastics. Any contribution is likely to be very small although with the advances in analytical techniques, labs will find fluorinated polymers almost anywhere they would want to look, but the contribution to microplastics would be very small due to the volumes. These products are durable and so they might not all be emitted. Responsible use including at end of life is important for any substance.
See: PlasticsEurope presents Operation Clean Sweep® Report on pellet containment: The European Plastics industry reinforces its commitment to fight marine litter :: PlasticsEurope

Assessing the potential PFAS legacy

Is there work going on or considering the development of C4SL generic assessment criteria for PFAS and PFOS? Similarly, are the EA working on any Tox reports for PFOS and PFAS?
This is something that is next steps in terms of further work that we are looking at. Ian Martin within the evidence directorate has previously been heavily involved in the guideline values and sits on the C4SL steering group. This is work in progress in terms of those discussions that PHE are having around the feasibility of developing relevant soil guideline values for use within the land contamination community. It would be some time before we get to the point where we are able to provide more detail on that. We are considering whether we should add it to the list of C4SL priority contaminants, but a decision has not yet been made.

Are previous Part IIA sites being included within the review for priority sites in the UK? I'm conscious that some of these sites (e.g. landfills) might have been assessed and deemed safe or remediated for some pollutants before we fully understood the risks from PFAS. Or do we not want to re-assess or re-remediate?

Are we also considering offshore point sources of PFAS and who covers this? E.g. oil and gas sites can use AFFFs for fire training and so could PFAS be important sources in coastal/marine areas if not properly managed?
We are not discounting Part IIA sites, we are looking at it from the top down, as opposed to saying it has already been investigated. It is an interesting question and I know colleagues in the US that are seeing where there are sites that had been signed off by US EPA as having been remediated and works had been complete. Now they are looking closer and finding PFAS at these sites and must reopen the sites and do further remediation.

Water industry chemical investigations

You have mentioned that the PFAS that has been found was not associated with the water treatment, but I wondered whether you indicated that sludge might have been the source or are you looking into other potential sources – the Derbyshire area is quite prone to wildfires – and if fire suppressants was an avenue you would be exploring?
The honest answer is we do not know where it is coming from and are keeping an open mind as to possible sources. We chose this catchment for further investigation purely because we found unexpectedly high levels of PFOS at a sample point upstream of the only sewage works in the river catchment area in CIP2. The sampling program now underway includes a number of additional points on watercourses upstream of the sewage works to see if we can more accurately pin down where it is coming from and possibly then infer potential source(s). Fire suppressants could be one such possibility.

Global perspectives on PFAS risk management & Overview of proposed EU approach

Will the studies currently underway, related to the CfE, be published?
My understanding is that they will not, the reports will inform the Competent Authorities producing the dossier.

It is not correct to say that the Oosterhuis study established benchmarks. it didn't - it just looked at cost effectiveness levels at which regulations had in the past been undertaken.
This should have been phrased better - 'indicative benchmarks' perhaps to reflect the uncertainty inherent in the approach to calculation. I don't see a problem with the use of the word 'benchmark' per se – it is simply a point of reference for the purpose of comparison.

I didn't catch from the presentation if toxicity is being considered alongside cost proportionality and if the use is 'essential'?
Essentiality will be considered once the responsible Member States see where (from the series of studies) there are viable alternatives and where there are not. Toxicity will be factored in where data are available - problem is that data is limited across the vast number of compounds.

When doing a risk analysis involving persistence and mobility it is necessary to include whether the application, such as firefighting foams or textile wash waters, is dispersive. Comments?
Agreed. But important not to focus only on the use phase. In some cases, use is not dispersive, but management at end of life may be.

Consideration of possible grouping approaches and essential uses

Do we need separate relative potency factors for different endpoints, and should additivity be on a mass or molar basis?

Yes, you would. You could make relative potency factors based on the pharmacokinetics and assume that the toxicity in the organs are the same. It works for liver hypotrophy, but it is an assumption you could use that would get you over having to measure all the different PFAS potencies for every endpoint. In that way the short chain acids will also have a lower toxicity, based on external dose, than the long chain acids because they are more rapidly eliminated. Otherwise, you would have to measure RPF for every endpoint. It should ideally be on a molar basis.

Is drinking water the main burden in public health terms or are there other sources? Looking at drinking water it is one specific part of the water cycle which is one part of the flux of the environmental media. Is there too much focus perhaps on drinking water and it is essential, but can we get side-tracked on worrying too much on our drinking water and not looking at other sources.

For each individual PFAS or even perfluoroalkyl acid, the exposure is quite different. For the long-chain perfluoroalkyl acids it is food (especially meat and fish) that is more important than water. I could have discussed a lot more about EOFs and my colleagues have applied it to various samples and not just drinking water, but also food, human blood, consumer products and the top assay - to try and get an idea of the different PFAS that we might be exposed to. You tend to find as you go from the source to the receptor, in a human there is a lower amount of unexplained PFAS in our blood then there is in the environment which is because we are not accumulating everything which is in the environment. There is still a fraction of unexplained PFAS in our blood, but in the environment there the fraction is substantial, and we cannot explain it with our targeted methods. My colleagues have looked at this fraction and have tried to understand what makes up this fraction, using suspect screening techniques and so on.

Summary of breakout groups

There were two breakout group sessions on day two of the workshop:

Breakout sessions	
Breakout session 1	Do you generally think the EU proposal is a positive or negative step for effective PFAS management?
	What is positive about the EU approach?
	What is negative about the EU approach?
	How would you improve the proposed EU approach to PFAS management?
Breakout session 2	What considerations should be made when developing the PFAS RMOA (Risk Management Options Analysis)?
	What role should product stewardship and voluntary schemes play in effective PFAS management?
	What would ideal UK policy on PFAS look like?

Breakout session 1 responses

1. Do you generally think the EU proposal is a positive or negative step for effective PFAS management?	
Positive	**35 (53%)**
Negative	**24 (36%)**
Neutral	**7 (11%)**

Note that approximately half the delegates responded to this question

2. Positive comments about the EU proposal	3. Negative comments about the EU proposal
The attendees mentioned that the EU positively addresses the issue surrounding regrettable substitution, whilst also promoting new and innovative solutions	A lot of the negativity that was aimed towards the EU approach was around the essential use concept, suggesting the definition is too broad and how grouping only looks at persistence
What was also seen as a positive proposal from the EU was the grouping strategy and precautionary approach of tackling the amount of substances	Some attendees said there are issues over the overlaps with other regulations (e.g. F-Gases Regulation) and suggested that a one size fits all approach is not suitable
Attendees felt as though the EU are putting the health of the populations and environment as their focus	Delegates thought the overall approach is too strict and is more about being seen as precautionary
The attendees felt that the actions taken by the EU are positive and they are going in the right direction to address the concerns	Some attendees said that the proposed concept of essential use should not be instead of a thorough impact assessment

Note that comments are ordered by number of mentions (highest to lowest)

Positive Quotes:

Gives clear direction of travel to guide innovation - basically saying we don't want new PFAS or new PFAS uses so focus on alternatives where they don't already exist
The fact that it looks at them as a group - we will never be able to be effective on a case by case basis
It appears to put the citizen, health and environmental outcomes at the centre of the activity
Precautionary action accounts for uncertainty of environmental impact not just now but against possibly unknown impacts which may not become apparent for many years

Negative Quotes:

Too broad a definition for regulatory purposes which doesn't consider all the intrinsic properties of chemicals e.g the mobility in the environment (e.g low mobility of fluoropolymers)
There are significant overlaps with other bits of regulation. This needs to be simplified. Compliance will be enhanced driven by simplicity
A restriction cannot be based on a perceived risk or on an uncertain risk and must be chemical specific. It cannot be based on unsubstantiated extrapolation of properties from one chemical to the other.
The essential use concept cannot replace a proper impact assessment process

4. How could the EU approach be improved?
There were lots of comments from delegates around the issue of grouping PFAS and which strategy is the correct one
There were various comments from delegates around the essential use concept and how this might be better defined
There were also some comments around not only looking at the substances themselves, but also the whole life cycle

Quotes:

Instead of a blanket approach, we believe PFAS should be grouped according to their structure and actual properties. Those PFAS substances or uses that do not present significant health or environmental risks, or where emissions can be managed, should not fall within the restriction scope
Define essential use - this could evolve over time but make a start. There could be grades of essentialness and the non-essential uses on throw away food packaging and clothing could be eliminated quickly
Should we only look at the chemicals? Would it be better to look at how it goes out into the environment and stop it?

Breakout session 2 responses

1. What considerations should be made when developing the PFAS RMOA (Risk Management Options Analysis)?
Participants seemed keen on the avoidance of any double regulation (e.g. F-Gases Regulation), but some viewed it as essential as some regulations are not exhaustive
There were comments around the need to look at the level of control around waste streams relating to certain applications
There were also remarks from participants around wanting the opportunity for stakeholders to engage in the RMOA process
Some attendees felt socio-economic aspects also need to be included

Quotes:

Recognition that double regulation may be needed where existing frameworks (e.g. F-gas regulation) only provide partial control
Factor in the level of control of the waste streams relating to PFAS applications (for example automotive, pharmaceutical)
Taking time to recognise all uses of PFAS is very important to develop effective RMOA. All sectors along the value chain should be approached and consulted
RMOA should consider also socio-economic aspects, including the impact of a regulatory action on the national economy (i.e., jobs, tax losses), national security, SMEs, supply chains, technological innovation, competitiveness of the EU/UK economy globally

2. What role should product stewardship and voluntary schemes play in effective PFAS management?
There was a strong sense that these schemes can be dispersed more globally and not just be confined to the country of origin
Some attendees mentioned that these schemes can work hand in hand with regulation
There was the view that these schemes allow governments to act faster in certain cases, allowing time for legislation to be put in place
Attendees cited the need for greater transparency amongst the producer to the end user, but some also say that this would only work in certain sectors where there has been consumer interest in this

Quotes:

Product Stewardship and voluntary industry schemes have the potential to be driven globally, not just in the UK or EU
Alongside regulation but not in place of regulation
Voluntary Agreements can be quicker to implement in those uses which are well understood, but ultimately probably need to be backed up by legislation to 'level the playing field
transparency. Good reasons why businesses might not be able to make all data/information open publicly but opportunity for transparency with regulators. More information needed down the value chain

3. What would ideal UK policy on PFAS look like?
Attendees expressed the importance of looking at the whole life cycle of the product when undertaking assessments and having the correct source control measures throughout the cycle
There was clear emphasis given on the need to encourage innovation and the promotion of green chemistry, but also including a broader range of considerations - like environment, health and use for instance
The alignment with the EU and internationally, to assistance with trade and clarity, was also seen as a key area for future policy
Dividing up PFAS into groups was also mentioned by some as an area for ideal UK policy, but also the careful decision making in terms of how they are divided and into which groups was an important area, suggesting the UK could take a lead in this field
There were also a few suggestions that all this needs backing up with certainty and clarity for industry so that they can effectively manage any chance to their own processes

Quotes:

Total life-cycle assessment - only used where the potential sources of exposure to the environment/ human exposure are known/controlled, with a known waste management
Would encourage and incentivise innovation towards greener chemistry, development of suitable safer alternatives and towards net zero
Close alignment with EU and International is beneficial for trade and clarity
Divide PFASs into groups where possible. Reduce the tonnages and particularly frivolous use
Timelines are important because of industry's need for certainty and clarity