

PFAS and Emerging contaminants

Legislation, what to expect in the EU and UK?
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PFAS - contacts



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And many more...

H&S moment

Toxicity

T R A C K TO 0

Which is more toxic?



Water



Glyphosate



Salt

What are Emerging Contaminants?

"Emerging contaminants" can be broadly defined as any synthetic or naturally occurring chemical or any microorganism that is not commonly monitored in the environment but has the potential to enter the environment and cause known or suspected adverse ecological and/or human health effects.



Existing and new substances

Emerging substances

- New, unknown substances with unknown effects
- Existing (old) substances with new developments concerning toxicity
- Existing (old) substances with new applications

New substances

- Toxicity not yet known
- Suspicion of toxicity to humans or ecosystem

Substances of very high concern (SVHC)

- PBT / vPvB: (very) Persistent – (very) Bioaccumulative - Toxic
- PMT: Persistent – Mobile – Toxic
- Carcinogenic
- Mutagenic
- Toxic for reproduction
- Endocrine disrupting

Note that:

Substances containing <0.1% of a SVHC are not considered to be a SVHC

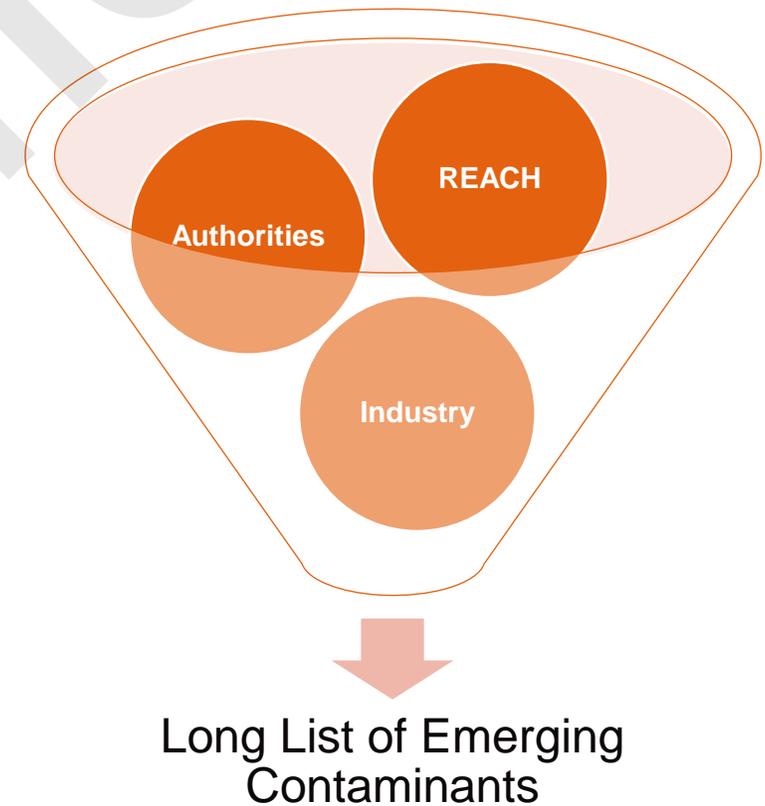
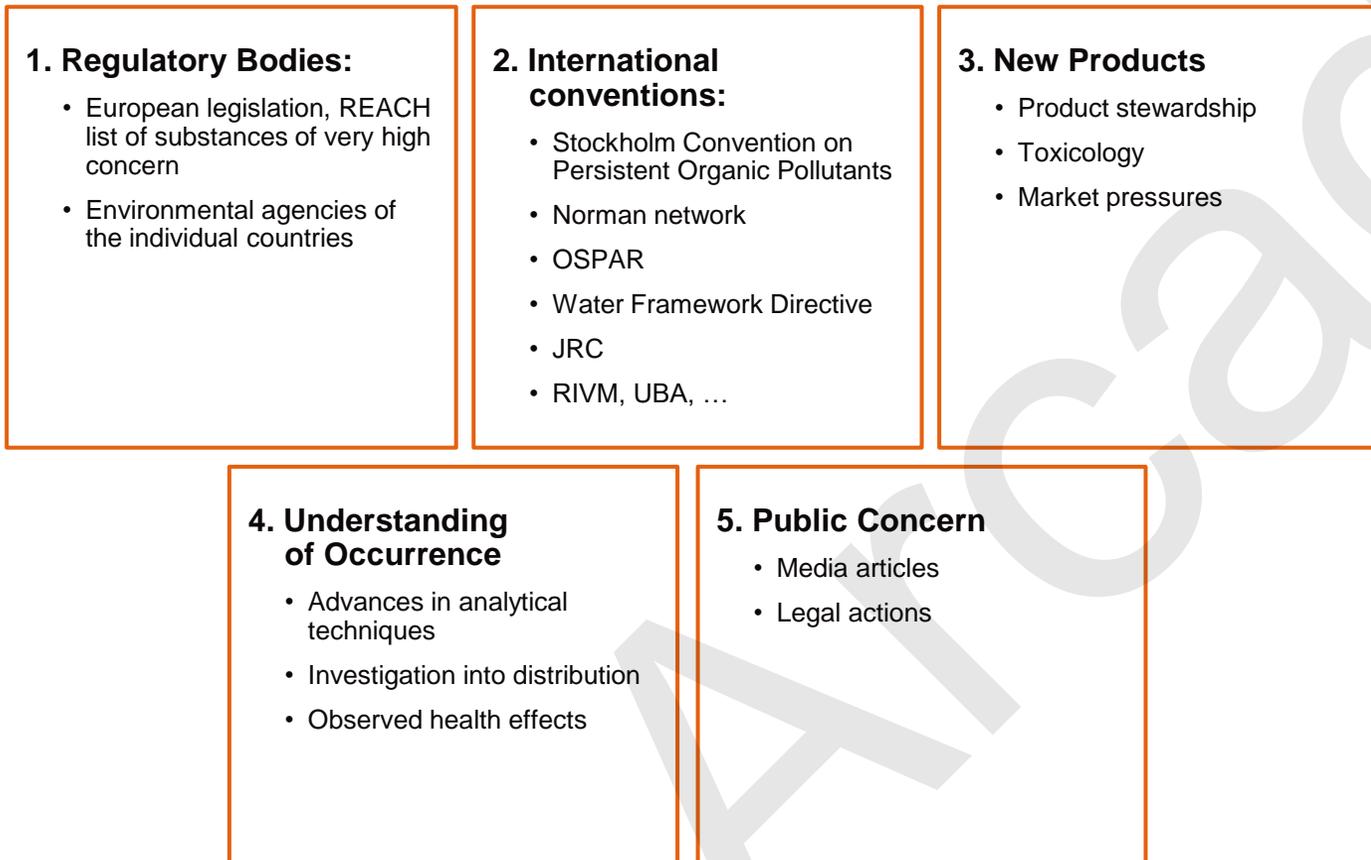
But it still contains a SVHC and emissions should be monitored

<0.1% = <1 g/kg = <1000000 µg/l = significant!

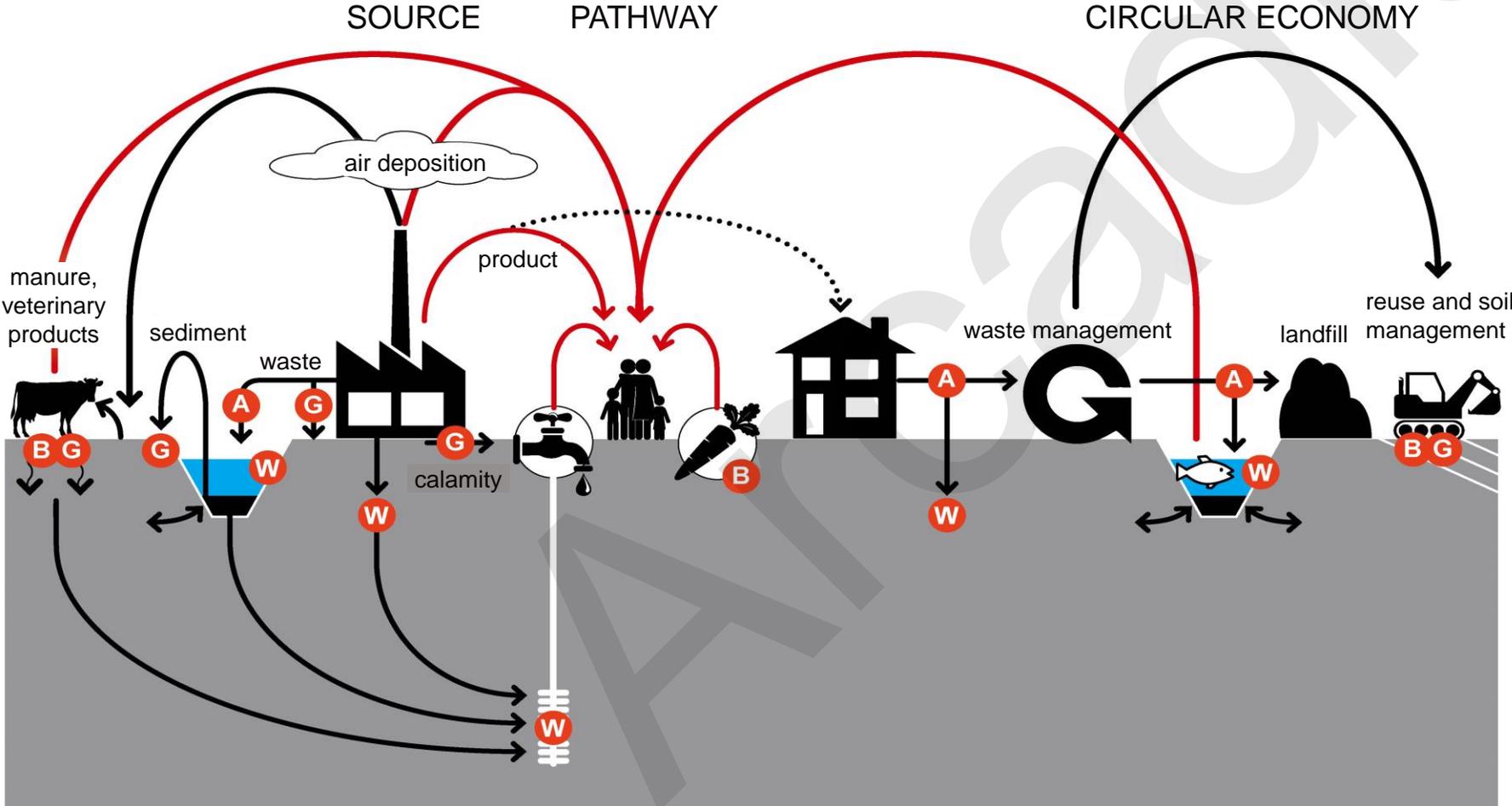
Not everything is given on the MSDS, especially not in the past



Existing and new substances

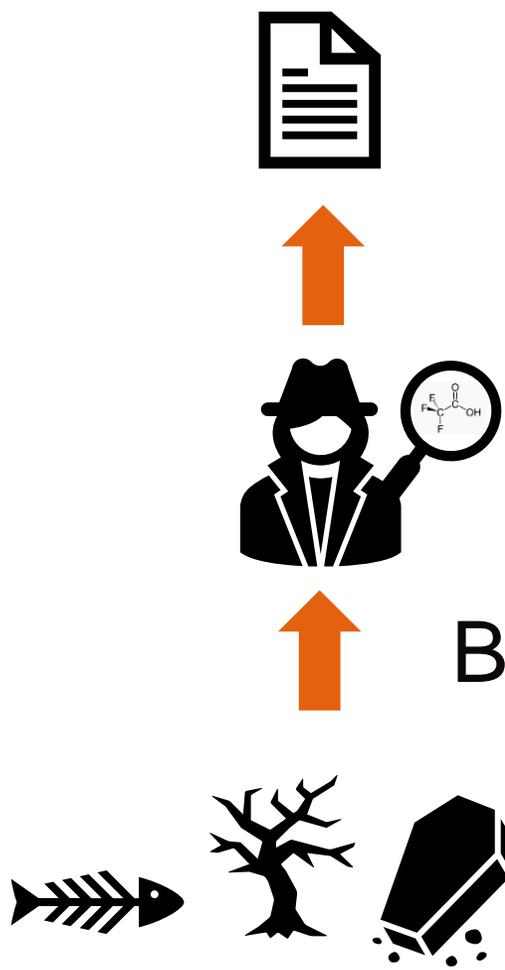


Emerging contaminants (can) have effect on:



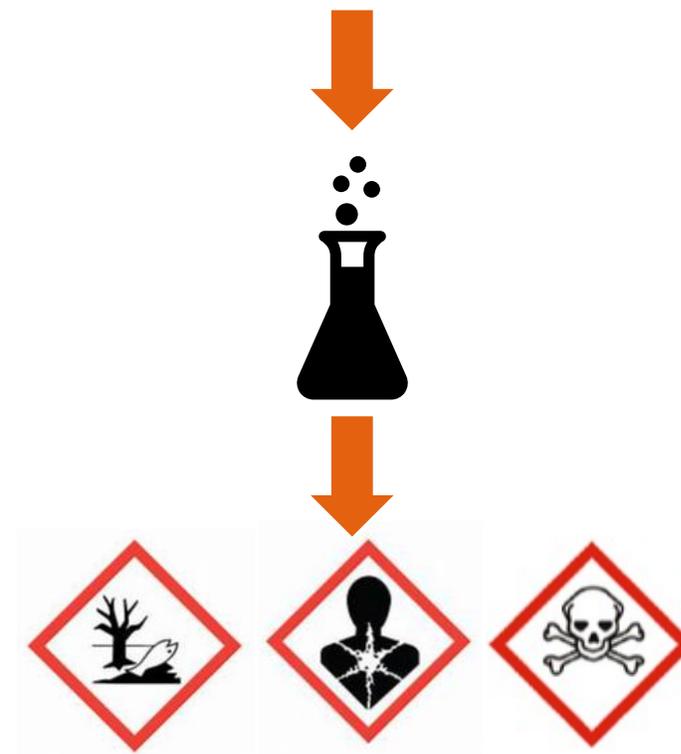
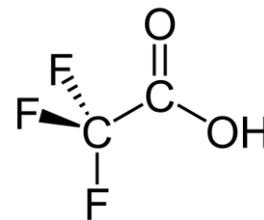
- Water and groundwater
- Soil management and reuse
- Diffuse contamination
- Waste and circular economy

How do you discover an EC?



Bottom up

Top down



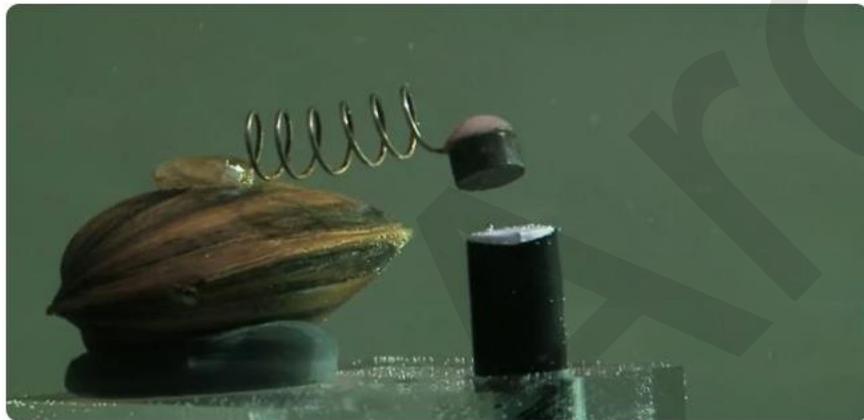
Bottom up

<https://www.ewg.org/news-insights/news/groundbreaking-reporting-helped>



Farmers exposed to harmful 'cocktail of pesticides': research

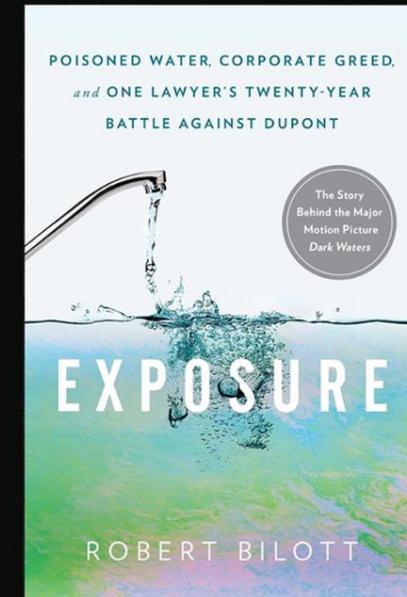
Business March 9, 2023



1limburg

Voorpagina Limburg Stemt Sport Cultuur & Media 112 Max Vers

Authorities still do not know what the origin of the contamination in the river Meuse is



The movie, Dark Waters is based on the book, EXPOSURE.

"A special thanks also to Bill Couzens and my fellow board members at Less Cancer and the folks at the Right Livelihood Award Foundation for continuing the effort to spread awareness of the cancer threat posed by PFOA and other PFAS chemicals."

— Robert Bilott, attorney and Less Cancer Board Member

<https://www.publicsource.org/pfas-lawyer-dark-waters-rob-bilott-dupont/>

terbutylazine
naas terecht is

ad met de
ar de stof vandaan

ys-can-it-be-cleaned-up/

Emerging Contaminants in Relevant Markets

Market/Activity	Emerging Contaminant	Risk and Readiness Markers
Energy production	Sulfolane	Sour natural gas, use as solvent
	Coal ash management	Coal used as energy source
	Dioxins	Waste incineration or incomplete combustion
	NORM/TENORM	Regional mining with naturally occurring uranium
General manufacturing/industrial	1,4-Dioxane diglyme, triglyme	Impurity in chlorinated solvents (1,1,1-TCA), use as solvent, byproduct in polyethyleneglycol production (soaps, detergents)
	Phthalates (endocrine disruptors)	Plasticizer
	Industry-specific (e.g., pharmaceuticals, PFAS)	Water/wastewater streams
	PFAS	Firefighting systems
Energy production	Sulfolane	Sour natural gas, use as solvent
	Coal ash management	Coal used as energy source

Emerging Contaminants in Relevant Markets

Market/Activity	Emerging Contaminant	Risk and Readiness Markers
Agriculture and associated manufacturing	Pesticides, many of which are endocrine disruptors	Use or manufacturing
	BCEE	Pesticide manufacturing or fungicide/bactericide
	TCP	Byproduct and component of agr. chemicals
Airports and other fire training	PFAS	Class B firefighting foams (AFFF)
Buildings	Flame retardants	Furniture, textiles, electronics
	PFAS	Textiles
Tech	Nanomaterials	Product generation
Electroplating industry	PFAS	Mist suppressant
	Hexavalent chromium	Use
Automotive	PFAS	Textiles, lubricants, AFFF
	6PPD & 6PPDQ	Tires

NORM/TENORM: naturally occurring radioactive material/technologically enhanced naturally occurring radioactive material

BCEE: bis (2-chloroethyl) ether

TCP: 1,2,3-trichloropropane

PFAS: poly- and perfluoroalkyl substances

European regulations

A woman with brown hair, wearing a grey sleeveless dress and hoop earrings, is seated at a wooden conference table. She is gesturing with her right hand while holding a black pen in her left. In front of her is a white coffee cup on a saucer. To her left, a man in a dark suit is seen from the back, looking towards her. To her right, another person is partially visible, also looking towards her. The background shows a blurred office setting with windows and blue curtains. A large, faint watermark of a dollar sign is visible in the background.

Legislation contaminants

● International

Stockholm Convention

- PBT compounds
- List of 39 compounds
- Pesticides/herbicides, dioxins, furans, PCBs, Brominated flame retardants, PFOS, PFOA, PFHxS

● European

● National

● Regional

All POPs listed in the Stockholm Convention

The chemicals targeted by the Stockholm Convention are listed in the annexes of the [convention text](#):

Annex A (Elimination)

Parties must take measures to eliminate the production and use of the chemicals listed under Annex A. [Specific exemptions](#) are available in Annex A and apply only to Parties that have registered for them.

Aldrin ●	Chlordane ●	Chlordecone ●
Decabromodiphenyl ether (commercial mixture, o-decaBDE) ▲	Dechlorane Plus ▲	Dicofol ●
Dieldrin ●	Endrin ●	Heptachlor ●
Hexabromobiphenyl ▲	Hexabromocyclododecane (HBCDD) ▲	Hexabromodiphenyl ether and heptabromodiphenyl ether ▲
Hexachlorobenzene (HCB) ● ▲	Hexachlorobutadiene ▲	Alpha hexachlorocyclohexane ●
Beta hexachlorocyclohexane ●	Lindane ●	Methoxychlor ●
Mirex ●	Pentachlorobenzene ● ▲	Pentachlorophenol and its salts and esters ●
Polychlorinated biphenyls (PCB) ▲	Polychlorinated naphthalenes ▲	Perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds ▲
Perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds ▲	Short-chain chlorinated paraffins (SCCPs) ▲	Technical endosulfan and its related isomers ●
Tetrabromodiphenyl ether and pentabromodiphenyl ether ▲	Toxaphene ●	UV-328 ▲

Annex B (Restriction)

Parties must take measures to restrict the production and use of the chemicals listed under Annex B in light of any applicable acceptable purposes and/or specific exemptions listed in the Annex.

DDT ●	Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) ● ▲
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Annex C (Unintentional production)

Parties must take measures to reduce the unintentional releases of chemicals listed under Annex C with the goal of continuing minimization and, where feasible, ultimate elimination.

Hexachlorobenzene (HCB) ■	Hexachlorobutadiene (HCBd) ■	Pentachlorobenzene ■	Polychlorinated biphenyls (PCB) ■
Polychlorinated dibenzo-p-dioxins (PCDD) ■	Polychlorinated dibenzofurans (PCDF) ■	Polychlorinated naphthalenes ■	

Legislation contaminants

● International

REACH

- Registration
- Evaluation
- Authorisation and restriction
- Chemical substances

● European

Lists:

- Restriction (73 compounds)
- Authorisation list – Annex XIV (59 compounds)
- Candidate list SVHC (240 compounds)
- Registry of restriction intentions until outcome (65)
- Registry of SVHC until outcome (262)

● National

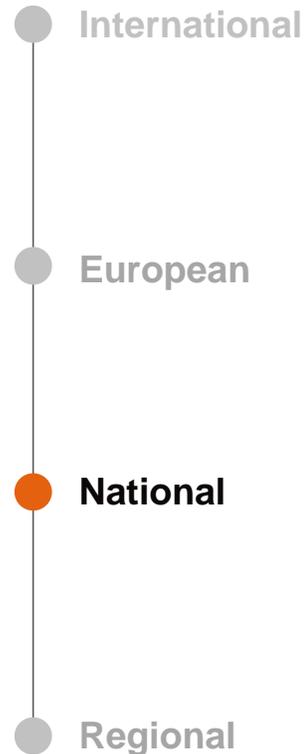
Gaps?

- Substances containing <0.1% of a SVHC are not considered to be a SVHC (<1 000 000 µg/l)
- MSDS; confidential information
- Polymers
- Persistent, mobile, toxic (PMT)
- Long-term effects
- Degradation products
- Mixture toxicity

● Regional

Emerging contaminants / issues

NL: Just create an enormous list



ZZS-list – list of substances of very high concern

- ~2000 substances
- CLP, OSPAR, WFD, REACH, POP
- Phasing out
- Restrictions concerning use
- Reduce emissions
- 5 year cycle of evaluation

CAS-nummer	Engelse stofnaam	ZZS volgens EU	gevaarsindeli	ZZS volge	ZZS vo
36861-47-9	I (±)-1,7,7-trimethyl-3-[(4-methylphenyl)methylene]bicyclo[2.2.1]heptan-2-yl	Ja			
41766-73-8	I (1,1-biphenyl)-4,4'-diamine, dihydrofluoride				
52754-64-0	I (1,1-biphenyl)-4,4'-diamine, monoacetate				
66836-18-8	I (1,1-biphenyl)-ar, ar', 4, 4'-tetramine				
95342-41-9	I (1R,3E,4S)-1,7,7-trimethyl-3-(4-methylbenzylidene)bicyclo[2.2.1]heptan-2-yl	Ja			
852541-21-0	I (1R,3Z,4S)-1,7,7-trimethyl-3-(4-methylbenzylidene)bicyclo[2.2.1]heptan-2-yl	Ja			
741687-98-9	I (1R,4S)-1,7,7-trimethyl-3-(4-methylbenzylidene)bicyclo[2.2.1]heptan-2-yl	Ja			
2440-02-0	I (1R,4S,5S)-1,2,3,4,5,7,7-heptachlorobicyclo[2.2.1]hept-2-ene				
115850-69-6	I (1RS,2SR,5RS)-2-(4-chlorobenzyl)-5-isc	Ja			
115937-89-8	I (1RS,2SR,5SR)-2-(4-chlorobenzyl)-5-isc	Ja			
852541-30-1	I (1S,3E,4R)-1,7,7-trimethyl-3-(4-methylbenzylidene)bicyclo[2.2.1]heptan-2-yl	Ja			
852541-25-4	I (1S,3Z,4R)-1,7,7-trimethyl-3-(4-methylbenzylidene)bicyclo[2.2.1]heptan-2-yl	Ja			
40722-80-3	I (2-chloroethyl)(3-hydroxypropyl)ammonit	Ja			
84852-39-1	I (2-ethylhexanoato-O)(isodecanoato-O)ir	Ja			
85508-45-8	I (2-ethylhexanoato-O)(isononanoato-O)ir	Ja			
85135-77-9	I (2-ethylhexanoato-O)(neodecanoato-O)ir	Ja			
1782063-81-1	I (3E)-1,7,7-trimethyl-3-(4-methylbenzylidene)bicyclo[2.2.1]heptan-2-onyl	Ja			
105024-66-6	I (4-ethoxyphenyl)(3-(4-fluoro-3-phenoxy)	Ja			
910606-39-2	I sulfonium, (4-methylphenyl)diphenyl-, 1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluoro-	Ja			
108225-03-2	I (6-(4-hydroxy-3-(2-methoxyphenylazo)-	Ja			
82413-20-5	I (E)-3-[1-(4-[2-(dimethylamino)ethoxy]phē	Ja			
96-09-3	I styrene oxide	Ja			
84852-36-8	I (isodecanoato-O)(isononanoato-O)nickel	Ja			
85166-19-4	I (isodecanoato-O)(isooctanoato-O)nickel	Ja			
85508-46-9	I (isononanoato-O)(isooctanoato-O)nickel	Ja			
85551-26-6	I (isononanoato-O)(neodecanoato-O)nickel	Ja			
84852-35-7	I (isooctanoato-O)(neodecanoato-O)nickel	Ja			
12275-07-9	I (maleato)triootetralead	Ja			
118658-93-4	I (methylenebis(4,1-phenyleneazo(1-(3-(dm	Ja			
59447-55-1	I (pentabromophenyl)methyl acrylate				
71411-66-0	I (R)-12-hydroxyoleic acid, barium cadmium salt				
51594-55-9	I R-1-chloro-2,3-epoxypropane	Ja			
5543-58-8	I (R)-4-hydroxy-3-(3-oxo-1-phenylbutyl)-	Ja			
5543-57-7	I (S)-4-hydroxy-3-(3-oxo-1-phenylbutyl)-	Ja			
64681-08-9	I (S)-dichloro[2-[[[2,3-dihydroxypropoxy]hydroxyphosphoryl]oxy]triethylmethylammoniat	Ja			
70987-78-9	I (S)-oxiranemethanol, 4-methylbenzene-	Ja			
421555-73-9	I sulfonium, (thiodi-4,1-phenylene)bis(diphenyl-, salt with 1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluoro-	Ja			
75166-31-3	I (aR)-4-[1,1-dimethylethyl]-a-methylbenzenepropanal	Ja			
75166-30-2	I (aS)-4-[1,1-dimethylethyl]-a-methylbenzenepropanal	Ja			
29377-13-7	I [(N,N-ethylenebis(glycinato))2-]-N,N,O,O'-cadmium	Ja			
65405-96-1	I [μ-(carbonato(2-)-O,O')] dihydroxytinick	Ja			
38668-12-1	I (1,1-biphenyl)-4,4'-diamine, perchlorate				
911027-68-4	I sulfonium, [4-[(2-methyl-1-oxo-2-propen-1-yl]oxy]phenyl]diphenyl-, 1,1,1,1-tetrafluoro-	Ja			
911027-69-5	I sulfonium, [4-[(2-methyl-1-oxo-2-propen-1-yl]oxy]phenyl]diphenyl-, salt wit	Ja			
12607-70-4	I [carbonato(2-)] tetrahydroxytinickel	Ja			
63011-06-9	I [phthalato(2-)]dioxotilead	Ja			
214353-17-0	I (2-amino-5-chlorophenyl)-2,2,2-trifluo				
244235-47-0	I (2-hydroxy-5-nonyl(branched)-phenyl)ethanone oxime				
1462414-59-0	I (4-butoxy-1-naphthalenyl)tetrahydrothiophenium 1,1,2,2,3,3,4,4,4-nor	Ja			
97416-84-7	I quinolinium, 1-(carboxymethyl)-4-[2-[4-(2,2-diphenylethyl)phenyl]	Ja			
375-72-4	I 1,1-isopropylidene)bis(3,5-dibromo-4-[2,3-dibromo-2-methylpropoxy]benzene]	Ja			
34454-97-2	I 1,1,2,2,3,3,4,4,4-nonatluorobutane-1-sulphonyl fluoride	Ja			
37853-59-1	I 1,1,2,2,3,3,4,4,4-nonatluoro-N-(2-hydroxyethyl)-N-methylbutane-1-sulf	Ja			
29806-76-6	I 1,1-ethane-1,2-dylbis[oxyl]bis(2,4,6-tribromobenzene]	Ja			
39001-02-0	I (1,1-biphenyl)-4,4'-diamine, monoperochlorate				
3268-87-9	I 1,2,3,4,6,7,8,9-octachlorodibenzofuran	Ja			
35822-46-9	I 1,2,3,4,6,7,8-heptachlorodibenzodioxin	Ja			
67562-39-4	I 1,2,3,4,6,7,8-heptachlorodibenzodioxin	Ja			
55673-89-7	I 1,2,3,4,7,8,9-heptachlorodibenzofuran	Ja			
39227-28-6	I 1,2,3,4,7,8-hexachlorodibenzodioxin	Ja			
70648-28-9	I 1,2,3,4,7,8-hexachlorodibenzofuran	Ja			

MSDS / product sheet - is not enough...

Technical Bulletin

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name: DX1025

1.2 Relevant identified uses of the substance or mixture and uses advised against

Application of the substance / the preparation: Fire fighting foam.

1.3 Details of the supplier of the safety data sheet

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Hazardous components:

CAS: 107-21-1 EINECS: 203-473-3 Index number: 603-027-00-1	ethanediol Acute Tox. 4, H302	19-<22%
CAS: 112-34-5 EINECS: 203-961-6 Index number: 603-096-00-8	2-(2-butoxyethoxy)ethanol Eye Irrit. 2, H319	7-<11%
CAS: 107-41-5 EINECS: 203-489-0 Index number: 603-053-00-3	2-methylpentane-2,4-diol Skin Irrit. 2, H315; Eye Irrit. 2, H319	4-<8%
CAS: 67-56-1 EINECS: 200-659-6 Index number: 603-001-00-X	Methanol Flam. Liq. 2, H225; Acute Tox. 3, H301; Acute Tox. 3, H311; Acute Tox. 3, H331; STOT SE 1, H370	1-<3%
CAS: 64-17-5 EINECS: 200-578-6 Index number: 603-002-00-5	ethanol Flam. Liq. 2, H225	1-<2%

Additional information: For the wording of the listed risk phrases refer to section 16.

DX1025 FLUROSURFACTANT

DX1025 is a blend of all **C6 fluorotelomer-based fluorosurfactants** that can lower the surface tension of aqueous solutions down to 17 dyne/cm at very low concentrations. DX1025 has been designed mainly for the formulation of fire-fighting foam concentrates such as Aqueous Film Forming Foam (AFFF) and Alcohol-Resistant Aqueous Film Forming Foam (AR-AFFF).

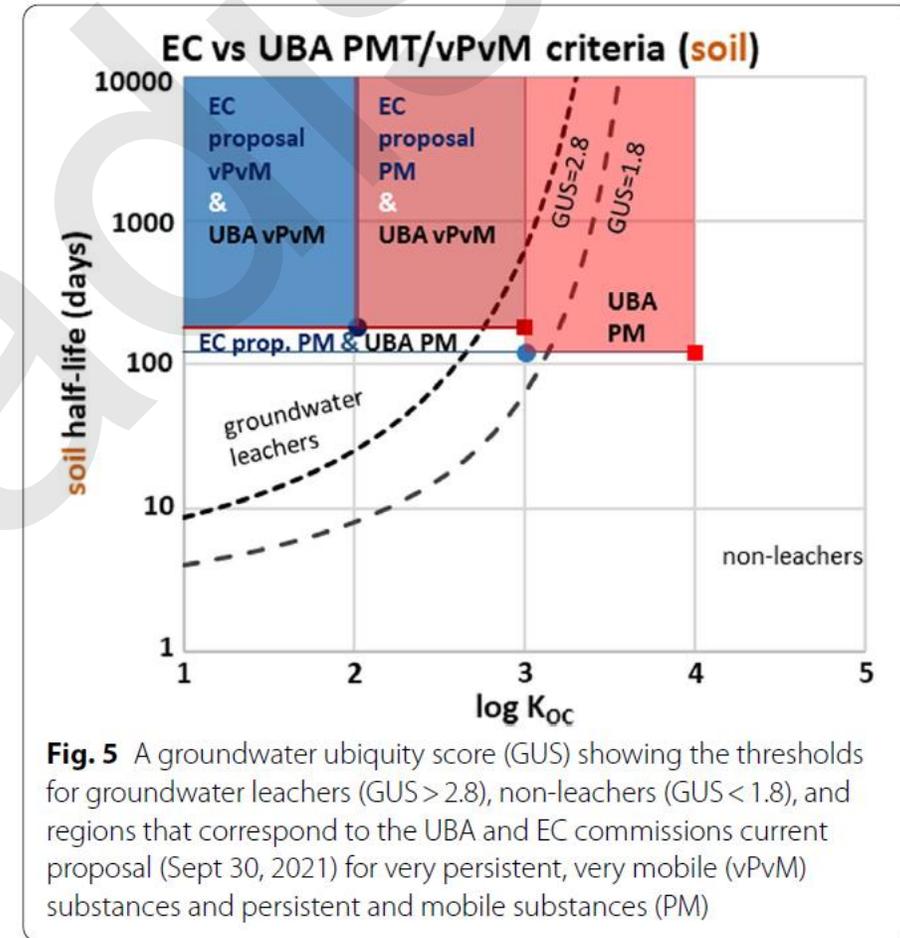
SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
Partially Fluorinated Surfactant		40 %
Ethanol	64-17-5	30.1 %

Any component and/or concentration (exact percentage) not specifically identified is considered a trade secret.

PMT substances

- Persistent, mobile, toxic
- PMT/vPvM
- Highly mobile in the environment
- Drinking water abstractions
- Are not removed by treatment
- → add to SVHC categories
 - E.g. trifluoroacetic acid (PFAS!)
 - 1,4-dioxane
 - Melamine
 - 1,2,4-triazole
 - Various PFAS
 - CHC
 - Aniline-compounds
 - Mostly small but persistent molecules

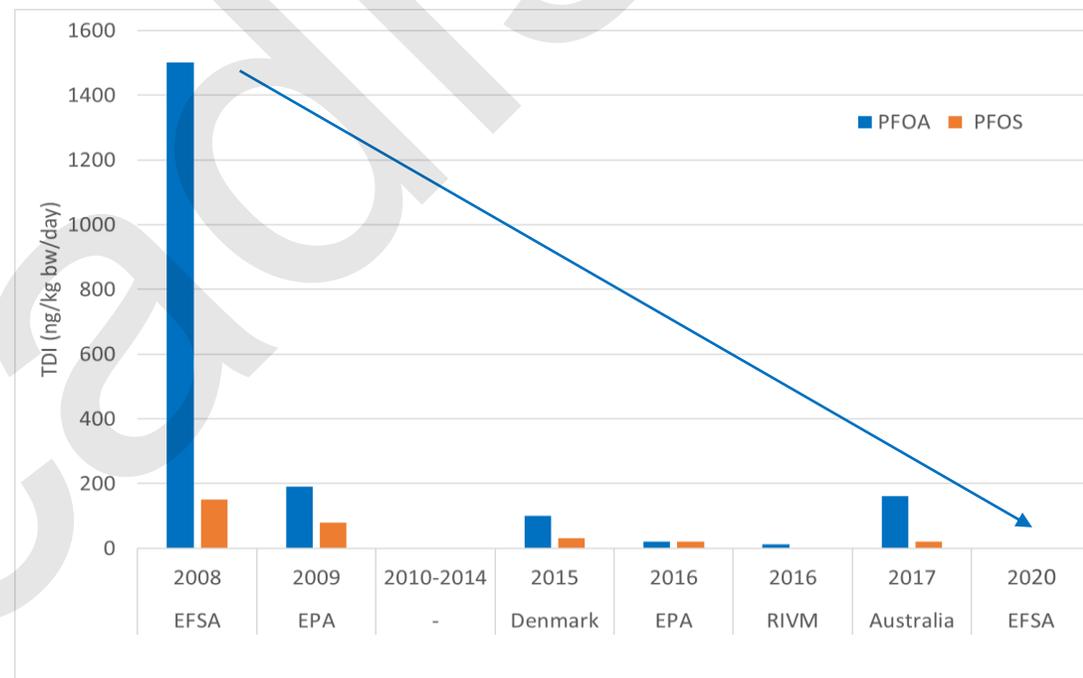


A photograph of four business professionals in a meeting room. A man with a beard and a woman with long dark hair are on the left, looking towards the right. An older man with glasses and a woman with glasses and a grey blazer are on the right, looking at a laptop. The room has large windows in the background. A large white text overlay is on the left side of the image.

PFAS, EU regulations and what to expect?

Tolerable daily intake

- 2020: EFSA derived a TWI of 4.4 ng/kg bw/week = 0,63 ng/kg bw/day
- TDI is the basis for deriving environmental quality standards!
 - Direct toxicity ecology
 - Indirect toxicity ecology
 - **Human consumption**
- Reassessment of European and National quality standards



We are in the middle of an evolving landscape of regulation

Drinking water directive – revised in 2020

DIRECTIVE (EU) 2020/2184 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 16 December 2020
on the quality of water intended for human consumption
(recast)

PFAS Total	0,50	µg/l	'PFAS Total' means the totality of per- and polyfluoroalkyl substances. This parametric value shall only apply once technical guidelines for monitoring this parameter are developed in accordance with Article 13(7). Member States may then decide to use either one or both of the parameters 'PFAS Total' or 'Sum of PFAS'.
Sum of PFAS	0,10	µg/l	'Sum of PFAS' means the sum of per- and polyfluoroalkyl substances considered a concern as regards water intended for human consumption listed in point 3 of Part B of Annex III. This is a subset of 'PFAS Total' substances that contain a perfluoroalkyl moiety with three or more carbons (i.e. $-C_nF_{2n-}$, $n \geq 3$) or a perfluoroalkylether moiety with two or more carbons (i.e. $-C_nF_{2n}OC_mF_{2m-}$, n and $m \geq 1$).

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020L2184>



Not based on EFSA!



Dossier PFAS-vervuiling

Een op de zes drinkwateranalyses in Vlaanderen voldoet niet aan de strengste PFAS-normen.

Foto: Getty Images

1 op de 6 Vlaamse drinkwaterstalen voldoet niet aan strengste PFAS-aanbevelingen

In 1 op de 6 drinkwaterstalen in Vlaanderen zit te veel PFAS volgens de strengste aanbevelingen. Dat schrijft de krant De Tijd op basis van [het rapport van de Vlaamse Milieumaatschappij \(VMM\)](#) over de drinkwaterkwaliteit in Vlaanderen in 2022. In de regio's Halle, Leuven, Oost-Limburg en grote delen van Oost-Vlaanderen zijn de PFAS-concentraties te hoog.

1 out of 6 drinking water samples in Flanders contains too much PFAS according to the strictest recommendations. That is what the newspaper De Tijd writes on the basis of the Flemish Environment Agency's (VMM) report on drinking water quality in Flanders in 2022. In the regions of Halle, Leuven, East Limburg and large parts of East Flanders, PFAS concentrations are too high.

Since 2020, the EFSA has set the threshold for this at **a combined 4 nanograms per litre of drinking water**. VMM's measurements now show that this latest value was exceeded in 1 in 6 analyses.

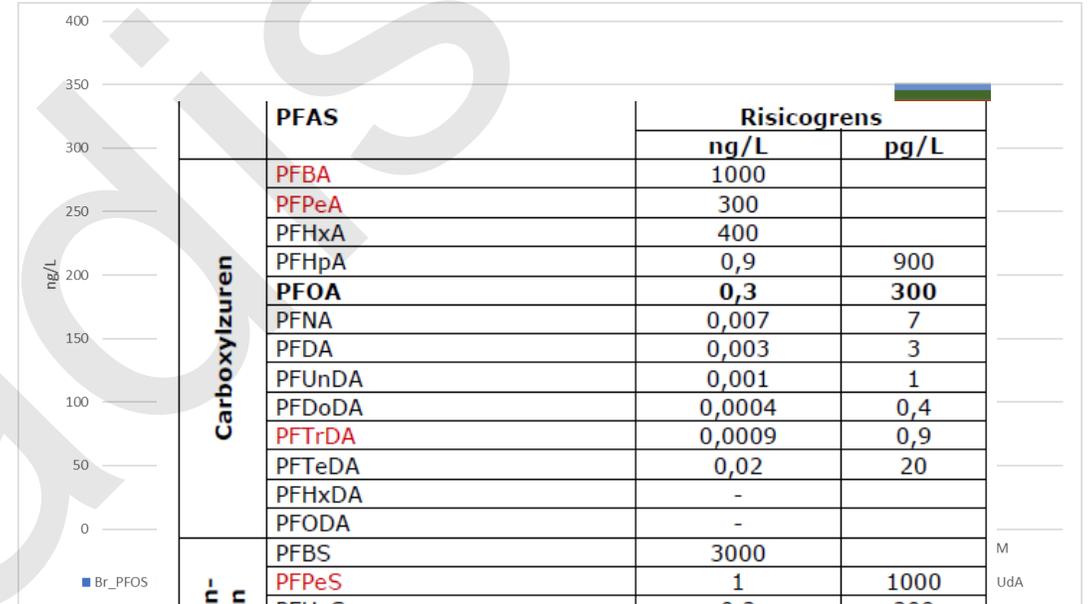
Surface water; Water framework Directive - PFAS

2013

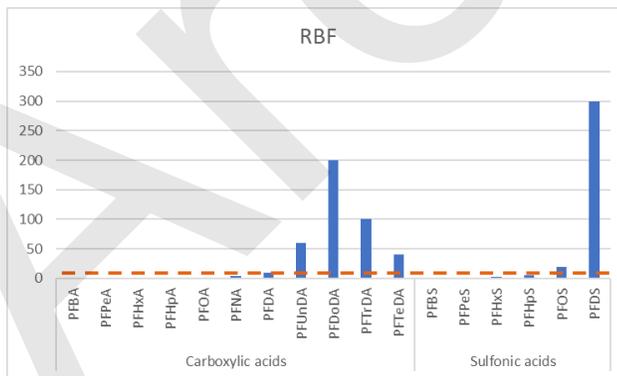
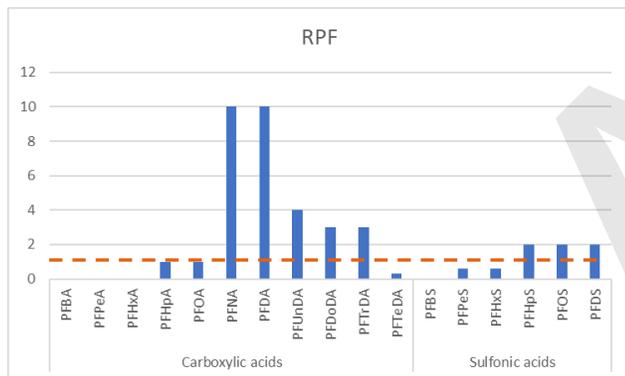
- PFOS 0,65 ng/l – to be achieved in 2027

2023: Proposal amendment

- Sum of 24 PFAS
- 4,4 ng/l – use of water as drinking water
- Mixture exposure
- Use of relative potency factors (toxicity compared to PFOA)
- NL: RIVM-report (2022) also addresses fish consumption and bioaccumulation (RBF)



	PFAS	Risicogrens	
		ng/L	pg/L
Carboxylzuren	PFBA	1000	
	PFPeA	300	
	PFHxA	400	
	PFHpA	0,9	900
	PFOA	0,3	300
	PFNA	0,007	7
	PFDA	0,003	3
	PFUnDA	0,001	1
	PFDoDA	0,0004	0,4
	PFTTrDA	0,0009	0,9
	PFTeDA	0,02	20
	PFHxDA	-	-
PFODA	-	-	
Sulfon-zuren	PFBS	3000	
	PFPeS	1	1000
	PFHxS	0,2	200
	PFHpS	0,02	20
	PFOS	0,007	7
PFDS	0,0004	0,4	
Overige	HFPO-DA (GenX)	10	
	ADONA	-	
	6:2 FTOH	40	
	8:2 FTOH	2	
	4:2 FTS	300	
	6:2 FTS	0,9	900
	8:2 FTS	0,007	7
	PFOSA=FOSA	0,007	7
	EtFOSAA	0,007	7
	MeFOSAA	0,007	7



What is ppq???

1. 1 human hair out of all the human hair in the world?
2. 1 second in 320 centuries?
3. 1 grain of sand in an Olympic size swimming pool?
4. 1 cm of 600 times around the earth.

ppq

parts per quadrillion
 1 ppq = 1 part in 1 quadrillion (10^{15})
 = 1 pg/L

- 1 second in 32 million years
- 1 cent in €10 trillion
- 1 cm in 10 billion km (or 0.15 mm distance travelled on the way to the Sun!)
- 1 drop of impurity in 500,000,000 barrels of water (or some 75 billion litres of water)
- 1 human hair out of all the hair on all the heads of all the people in the world

There are no known analytical techniques that can measure with this degree of accuracy; nevertheless, it is used in some mathematical models of toxicology and epidemiology.



ppt

Recap omnipresence

Soil background NL/BE	PFOS/PFOA	~ 1 500 ng/kg
Ground water Phreatic	sum PFAS	~ 30 ng/l
Surface water Rhine/Meuse	EFSA 4	~ 10 ng/l
Rain	EFSA 4	~ 1-2 ng/l
Vegetables	sum PFAS	~ 10 ng/kg
Dust households and offices	sum PFAS	~ 1 000 000 ng/kg
Bloodserum EU	sum PFAS	~ 20 000 ng/l
Consumer goods	sum PFAS	~ 100 000 ng/l

Background levels exceed proposed target levels

Target levels:

Drinking water (EU)	sum PFAS	100 ng/l / 500 ng/l
Drinking water (NL)	sum PFAS (PEQ)	4.4 ng/l
Surface water AA-EQS (EU)	sum PFAS (PEQ)	4.4 ng/l
Surface water (NL)	PFOS	0.007 ng/l
Soil vegetable garden (NL)	PFOS/PFOA	2 400 ng/kg / 2 300 ng/kg
Intervention level soil (NL)	PFOS/PFOA	60 000 ng/kg

Take away; the balance

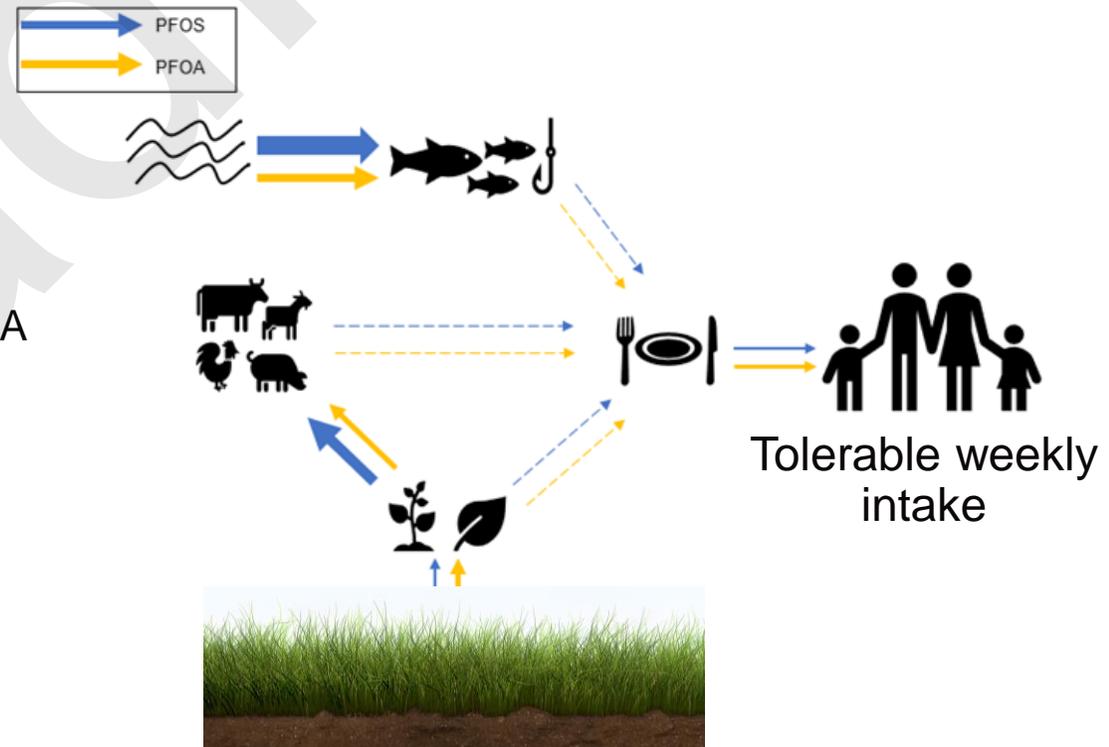
- Target levels are going down, where does it end?
- Treatment of background levels?
- Needed?
 - Target levels;
 - Proportionality
 - Socioeconomic analysis
 - Risk based approach / sustainability
 - European Ban on PFAS
 - Is the EFSA TDI the right target?



Don't try this at home...

EFSA TWI

- The basis for deriving environmental quality standards
- Based on epidemiological studies instead of animal studies
- NOAEL – **No observed adverse effect level**
 - Based on 1 study
 - Reduced antibodies
 - Association only found for PFOA, not for PFOS, PFHxS or PFNA
- Used with relative potency factors for 24 PFAS
- EFSA: 4 PFAS
- Epidemiological research; based on 1 PFAS





Dossier PFAS-vervuiling

Een op de zes drinkwateranalyses in Vlaanderen voldoet niet aan de strengste PFAS-normen.

Foto: Getty Images

1 op de 6 Vlaamse drinkwaterstalen voldoet niet aan strengste PFAS-aanbevelingen

In 1 op de 6 drinkwaterstalen in Vlaanderen zit te veel PFAS volgens de strengste aanbevelingen. Dat schrijft de krant De Tijd op basis van [het rapport van de Vlaamse Milieumaatschappij \(VMM\)](#) over de drinkwaterkwaliteit in Vlaanderen in 2022. In de regio's Halle, Leuven, Oost-Limburg en grote delen van Oost-Vlaanderen zijn de PFAS-concentraties te hoog.

Since 2020, the EFSA has set the threshold for this at a combined 4 nanograms per litre of drinking water. VMM's measurements now show that this latest value was exceeded in 1 out of 6 analyses.

In a comment, the VMM said that "based on current scientific knowledge, it is not yet entirely clear whether the EFSA-4 value is the most appropriate health-based limit for PFAS in drinking water".

POP & REACH PFAS – PFAS in products

	PFAS Compounds	Threshold	Status / Source
Long Chain PFAS	PFOS (C8) + Derivatives	0.001% (10,000 ppb)	Banned, POPs Regs ¹
	PFOA (C8) / Derivatives	25 ppb / 1,000 ppb	Restrictions, POPs Regs ¹
	PFHxS (C6) / Derivatives	25 ppb / 1,000 ppb 100 ppb in foam	Restrictions, POPs Regs ²
	C9-C14 PFCAs / Derivatives	25 ppb / 260 ppb	EU REACH ³
Short Chain PFAS	PFHxA (C6) / Derivatives	25 ppb / 1,000 ppb	Finalised, to be adopted ^{4*}
Long + Short Chain PFAS	All PFAS in Firefighting Foam	1,000 ppb	Finalised, to be adopted ⁵
All PFAS	Wide range of PFAS uses	tbd	Being evaluated

PFOA (C8) & C9-C14 Restriction Timeline¹

July 2020	No Training Testing Contained
July 2021	Notify Stockpiles
Jan 2023	Use 100% Contained
July 2025	No permitted use Destroy

* Proposed PFHxA (C6) exemptions – defence applications, 5 years for training/testing, 12 years for Class B foams at storage tanks >500m²

¹The Persistent Organic Pollutants (POPs) Regulations 2007 No. 3106

²POPRC-15/1: Perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds

³European Commission Regulation (EU) 2021/1297, 4 August 2021

⁴European Chemicals Agency, 27/09/2021. Registry of Restriction Intentions (<https://echa.europa.eu/registry-of-restriction-intentions/-/dislist/details/0b0236e18323a25d>)

⁵European Chemicals Agency. Registry of Restriction Intentions (<https://echa.europa.eu/registry-of-restriction-intentions/-/dislist/details/0b0236e1856e8ce6>)

⁶European Chemicals Agency. Registry of Restriction Intentions (<https://echa.europa.eu/nl/registry-of-restriction-intentions/-/dislist/details/0b0236e18663449b>)



EU broad PFAS restriction proposal

Submitted in February 2023, 5600 comments

Ban on **manufacture, usage and placing** on the market of PFAS as substances on their own and on the placing on the market as constituents, a mixture or an article in a concentration of or above:

- 25 ppb for any PFAS as measured with targeted PFAS analysis (polymeric PFASs excluded from quantification)
- 250 ppb for the sum of PFASs measured as sum of targeted PFAS analysis, optionally with prior degradation of precursors (polymeric PFAS excluded from quantification)
- 50 ppm for PFAS (polymeric PFAS included). If total fluorine exceeds 50 mg F/kg the manufacturer, importer or downstream user shall upon request provide to the enforcement authorities a proof for the fluorine measured as content of either PFAS or non-PFAS.

Be aware of regrettable substitution



<https://echa.europa.eu/registry-of-restriction-intentions/-/dislist/details/0b0236e18663449b>

Opinion development
Everyone can now have a say about the dossier and provide information.

Negotiations in Brussels

2023 Submitting dossier and opinion development

Submitting dossier by joint countries at ECHA

Public consultation by ECHA

2024 Continue opinion development

Opinion of the Committee for Risk Assessment (RAC) ready
Concept opinion of the Committee for Socio-Economic Analysis (SEAC) ready

Public consultation
SEAC opinion
European Scientific Committees form a scientific position on the dossier

Combined RAC and SEAC opinion ready

The European Commission drafts a proposal for European PFAS legislation

2024 Proposal European Commission and negotiations

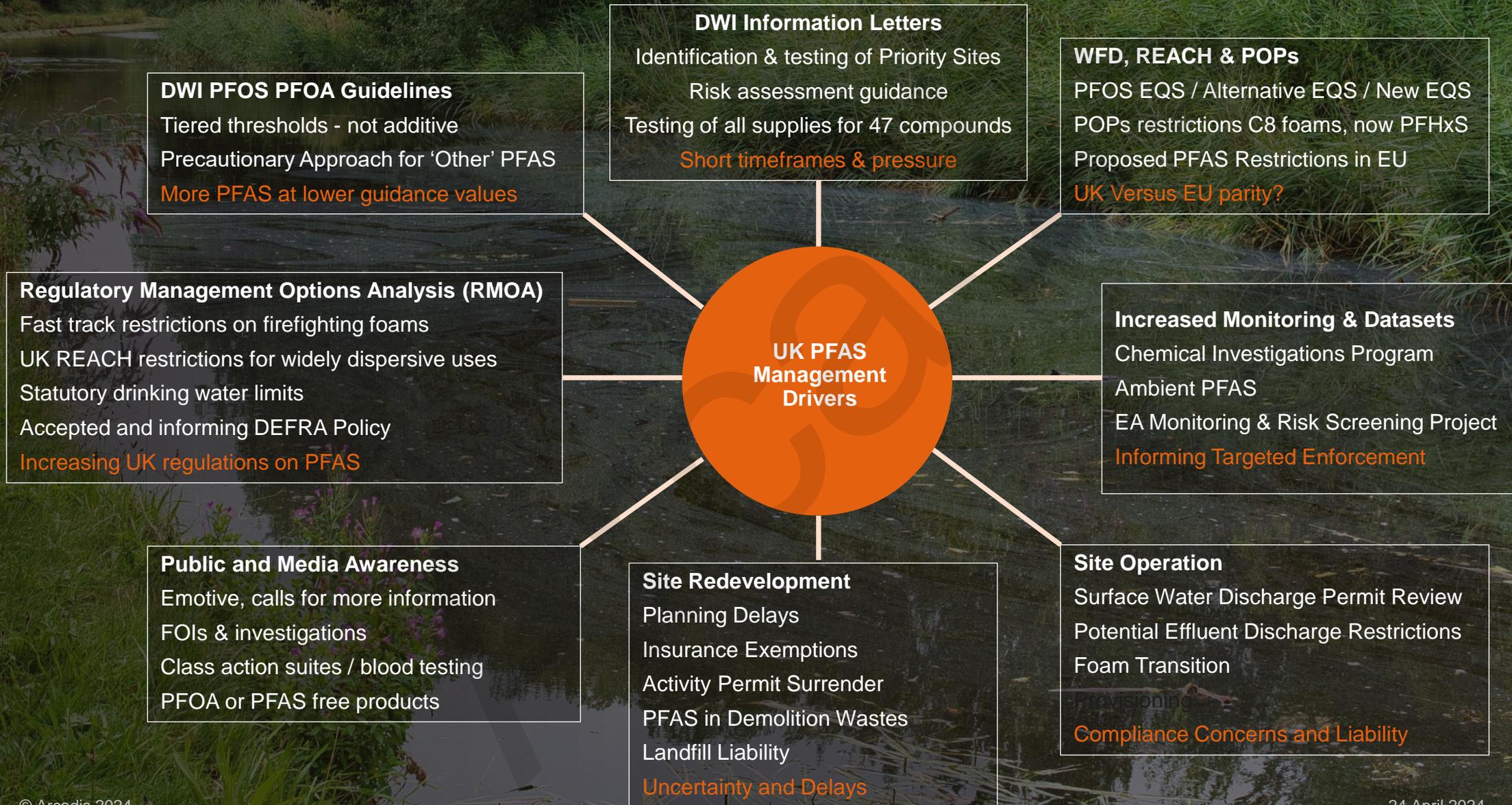
2025 Decision

The legislation enters into force
Restriction is included in Annex XVII of the REACH regulation.



United Kingdom

UK PFAS Context



Contacts:

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[Emerging Contaminants - Home \(sharepoint.com\)](#)

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