Understanding PFAS Regulatory Frameworks Across EU, UK, and US

If you wish to avoid sharing personally identifiable information, do not provide private information during webinar entry or during the session.

This session will be recorded.

Speaker Introduction

Monika E. Kotkowska

Senior CDX Consultant / Regulatory Product Compliance Expert

- Specializes in Regulatory Product Compliance, ESG, and Chemical Management Solutions.
- Certified Agile and PRINCE Project Manager.
- Currently pursuing a Master of Business Administration (MBA) with a focus on ESG topics
- Holds a Master's degree in Chemistry and Engineering from the University of Technology in Wroclaw, Poland.
- Over a decade of experience in diverse regulatory RA.
- Actively involved in IAEG, AIAG, and more recently, AEM.
- Outside of work, a true travel backpacker at heart.

Monika.Kotkowska@dxc.com

LinkedIn profile

Speaker Introduction

Will Martin

Managing Director of EPR Consulting Ltd

- Provider of Chemical Service to DXC Technology, managing substance & regulatory updates in IMDS & CDX
- DXC Training partner for UK
- Consultant to ACEA supporting Substance Impact Assessment Process (SIAP), and GADSL processes
- Member of Institute of Environmental Assessment and Management (IEMA)
- Developed software and data to support M&P compliance and risk assessments, integrated with product development for aerospace companies

Will.Martin@epr-consulting.co.uk

Linkedin profile

Speaker Introduction

Chuck LePard

Executive Consultant, IMDS & CDX Americas Representative

- Degrees in Electrical & Computer Engineering and Computer Science
- United States Navy Veteran
- 39+ Years EDS/General Motors/Hewlett Packard/HPE / EntServ / DXC
- Decades of plant floor and engineering experience in related areas
- Advisor to multiple manufacturing industry groups
  - Automotive Industry Action Group
  - International Aerospace Environmental Group
  - Association of Equipment Manufacturers
  - Responsible Materials Initiative
- Leader in Standards Development
  - IPC 2-18 175x family for Product Declaration and Compliance reporting
  - American National Standards Institute (ANSI)
  - International Standards Organization (ISO) Technical Committee TC-111 on Environmental Compliance, Corporate Responsibility & Sustainability Data Exchange

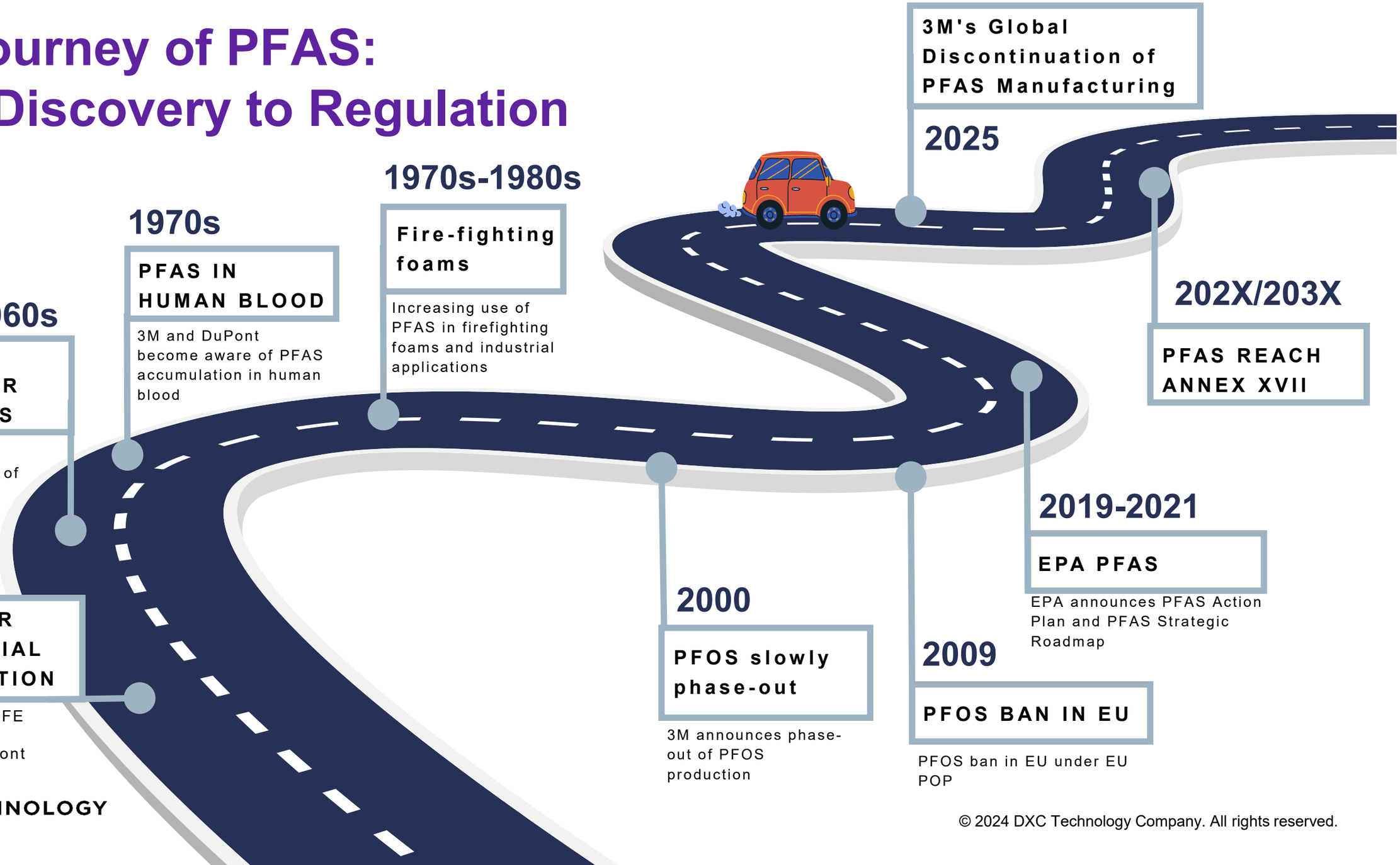
Chuck.LePard@dxc.com
LinkedIn Profile

Agenda

1. Overview of PFAS and their significance
2. In-depth analysis of the PFAS regulatory landscape in the EU
3. PFAS regulatory developments in the UK
4. The current state of PFAS regulations in the US
5. Strategies for narrowing down PFAS data collection from 15k to 3k
6. Live demonstration of the CDX System
7. Interactive Q&A session with our expert panel

DXC TECHNOLOGY

The Journey of PFAS: From Discovery to Regulation



1938
PTFE FOR INDUSTRIAL PRODUCTION

Discovery of PTFE (Teflon) by Roy Plunkett at DuPont

1950s-1960s
PFAS IN CONSUMER PRODUCTS

Widespread commercial use of PFAS begins

1970s
PFAS IN HUMAN BLOOD

3M and DuPont become aware of PFAS accumulation in human blood

1970s-1980s
Fire-fighting foams

Increasing use of PFAS in firefighting foams and industrial applications

2000
PFOS slowly phase-out

3M announces phase-out of PFOS production

2009
PFOS BAN IN EU

PFOS ban in EU under EU POP

2019-2021
EPA PFAS

EPA announces PFAS Action Plan and PFAS Strategic Roadmap

2025
3M's Global Discontinuation of PFAS Manufacturing

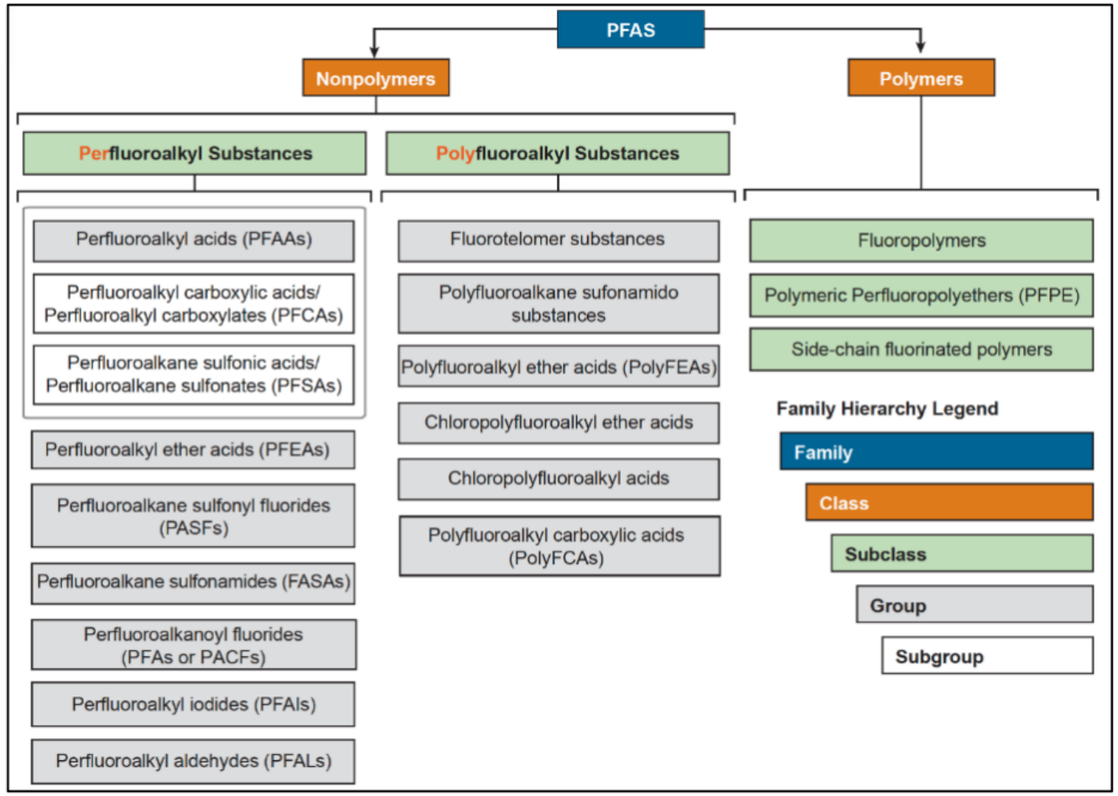
202X/203X
PFAS REACH ANNEX XVII

DXC TECHNOLOGY

“Forever chemicals” – Definitional Complexities

Overview of Per- and Polyfluoroalkyl Substances (PFAS)

- **Extensive Family of Chemicals:** PFAS are a large family of more than 10,000 synthetic chemicals.
- **Chemical *Diversity*:** PFAS are chemically diverse, with variations in chain length, functional groups, and molecular structure [1].
- **Evolving Knowledge:** Scientific understanding of PFAS is still evolving, with new information about their properties, environmental behavior, and health effects continually emerging [2].
- **Regulatory Challenges:** Different regulatory bodies and scientific organizations may adopt varying criteria for what constitutes a PFAS, leading to inconsistencies in definitions [3].
  - EU REACH Restriction Proposal aligned with OECD (Includes compounds with at least one perfluoroalkyl moiety (CnF2n+1)
  - U.S. TSCA Reporting Rule (structural definition)
  - State of Maine Reporting & Restriction Rule (at least one fully fluorinated carbon atom)
  - UK Regulatory Management Options Analysis (RMOA) (to or more contiguous perfluorinated methylene groups)
- **Industry Influence:** The definition of PFAS can have significant regulatory and economic implications.



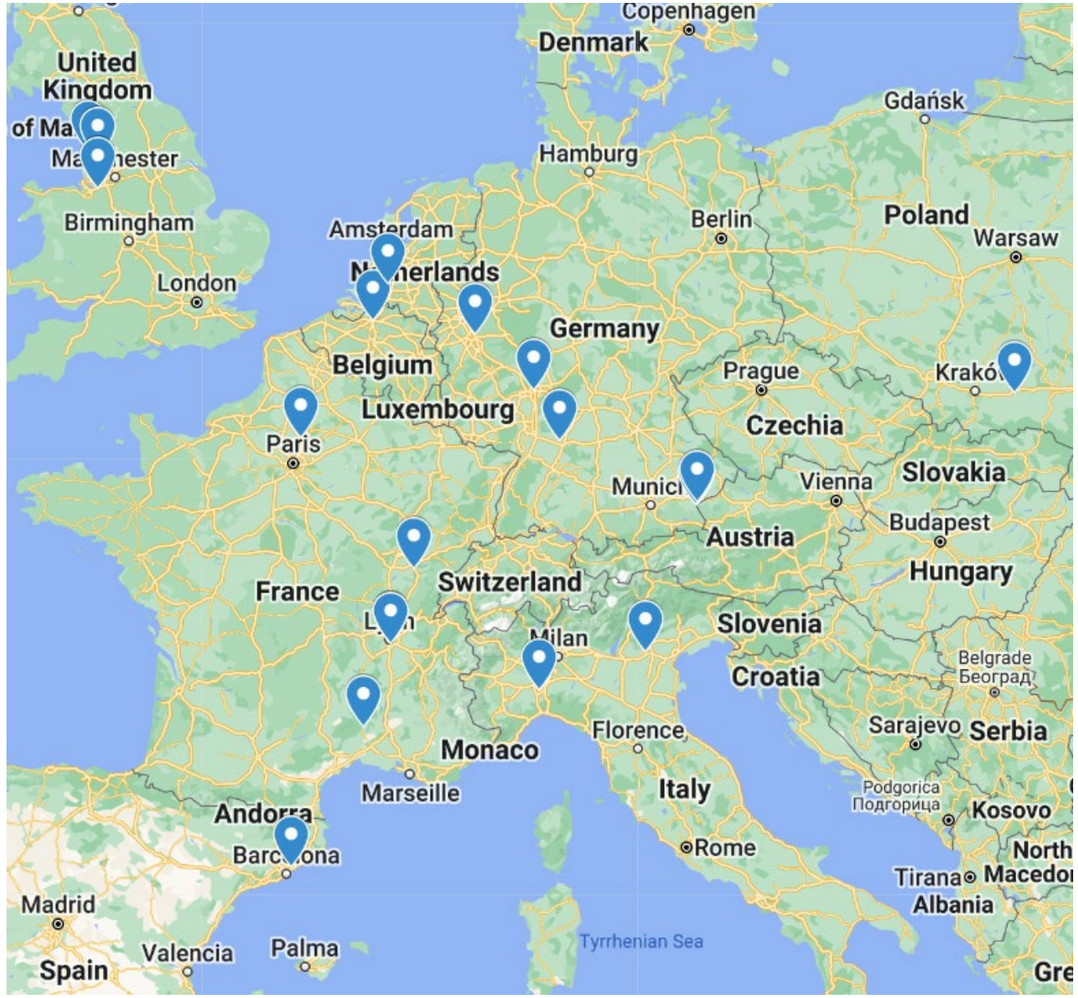
Source: Naming Conventions for Per- and Polyfluoroalkyl Substances (PFAS); The Interstate Technology & Regulatory Council (ITRC); Sep 2023.

The top 12 PFAS producers in the world

PFAS Manufacturing Sites Globally

Twelve chemical companies are responsible for the majority of the global PFAS production [1]. These sites are involved in synthesizing PFAS, which are crucial components used in various sectors.

	Major PFAS producer	Global Fluoropolymers production [2]
1.	Shandong Dongyue	13 %
2.	Chemours	12 %
3.	Daikin	11 %
4.	Solvay	8 %
5.	Arkema	7 %
6.	3M	5 %
7.	AGC	4 %
8.	Archroma	included in 40 % of Others
9.	Merck	included in 40 % of Others
10.	Bayer	included in 40 % of Others
11.	BASF	included in 40 % of Others
12.	Honeywell	included in 40 % of Others



Currently 20 PFAS manufacturing sites in the EU, including the UK.

Progress in PFAS Phase-Out by Major Manufacturers

PFAS chemicals have been detected in the blood of 97% of Americans, highlighting the widespread nature of contamination.

1. **3M:** Targets a global halt in PFAS-related product manufacturing by 2025 and production was down 20% in 2023 [1].
2. **Arkema:** Eliminated long-chain PFAS processing aids; transitioning to non-PFAS surfactants by 2024 [2].
3. **Chemours:** Dedicates to fluorine chemistry innovation, pledging a 99% cut in fluorinated organic compound emissions, with a 40% reduction achieved by 2021 [2].
4. **Solvay:** Commits to phasing out fluorinated surfactants by 2026 [2].

Why have companies decided to move away from PFAS?

- Evolving Regulatory Trends
- Changing Stakeholders expectations
- Commitment to sustainability and innovation
- Expensive litigation
  - **3M Settlement** - agreement to pay $10.3 billion payable over 13 years (from July 1, 2024, to April 15, 2036) to support PFAS remediation for US public water suppliers (PWS) [3]
  - **DuPoint Settlement** - payment of $1.185 billion to settle all claims of PFAS contamination in public water systems against DuPont. [3]

DXC TECHNOLOGY

Photo: wolterke - stock.adobe.com

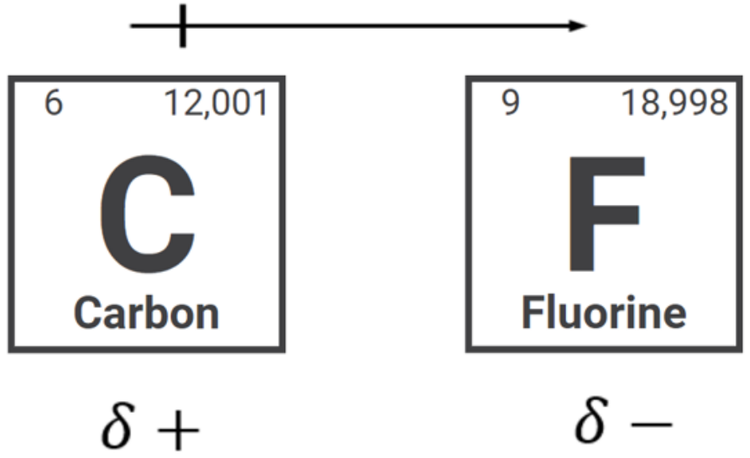
PFAS Usage in Industry today

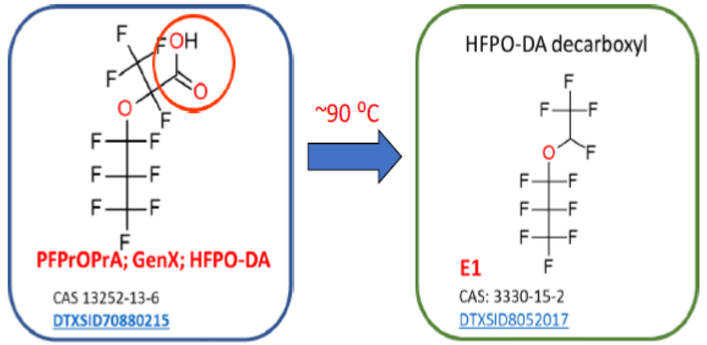
- Adhesives
- Bacteria / virus resistant fabrics
- Batteries
- Bushes and Bearing surfaces
- Cable and wire insulation
- Chemical / Biological resistant PPE
- Circuit board films
- Cleaning fluids for microelectronics
- Conduit and conduit connectors
- Conformal coatings
- Dirt resistant fabrics
- Fabric treatments
- Fire fighting foam
- Flame resistant
- Flexible joints
- Flexible plastic
- Gaskets
- Greases
- Hoses
- Hydraulic fluids
- Lubricants
- Non-stick coatings
- O-Rings
- Paints
- Pipe & tank linings
- Potting Gels
- Sealant and Seals
- Self-cleaning coatings for weather resistance
- Semiconductor manufacturing aids
- Shock absorbers
- Smudge resistant touch screens
- Stain-resistant sprays and treatments
- Surfactants
- Tubes
- Valves
- Waterproof fabrics
- …

Understanding Per- and Polyfluoroalkyl Substances (PFAS)

"Forever Chemicals" - The Resilience of PFAS Explained

- **Strong Chemical Bonds:**
  - **Carbon-Fluorine (C-F) Bond:** Highlight the exceptional strength of the C-F bond, which is one of the strongest in organic chemistry, making PFAS highly resistant to degradation.
- **Environmental Persistence:**
  - **Long-Term Presence:** Emphasize that PFAS can remain in the environment for centuries, with some having a half-life of over 1,000 years.
  - **Regulatory Challenges:** Note that PFAS often exceed the persistence criteria set by regulations such as the EU's REACH Annex XIII, complicating efforts to manage their environmental impact.
- **Bioaccumulation:**
  - **Accumulation in Living Organisms:** Detail how PFAS accumulate in the food chain, affecting humans and wildlife, and can persist for years in the body.
  - **Health Implications:** Mention specific health concerns associated with PFAS accumulation, such as increased cholesterol levels, thyroid hormone disruption, and potential links to certain cancers.
- **Mobility:**
  - **Widespread Distribution**: Illustrate the ability of PFAS to travel long distances from their point of origin, contaminating remote ecosystems like deep-sea environments and the Arctic.
- **Toxicity**
  - **Health Risks:** Expand on the toxicological effects of PFAS, including their association with liver damage, high cholesterol, obesity, diabetes, cancer, thyroid disease, asthma, immune system dysfunction, reduced fertility, low birth weight, and developmental issues in children.





The Lifecycle and Contamination Impact of PFAS

The average market price of PFAS is €19 per kilogram, however, if the societal costs were included, the accurate price would be €18 734 per kilogram [1].

Major PFAS Contamination:

1. **Firefighting aqueous film-forming foam (AFFF)** used at airports, military sites, chemical plants, and facilities with above-ground petroleum storage tanks.
    - **Ronneby, Sweden**: PFAS from AFFF at a military airport led to drinking water contamination [2].
    - **United States:** PFAS contamination from AFFF has been found in drinking water sources near military bases, such as the contamination at Peterson Air Force Base in Colorado [3].
    - **United Kingdom:** PFAS contamination from AFFF has been reported at various airports and military sites, including the contamination at RAF Fairford [4].

2. **Industrial production of PFAS** has resulted in extensive environmental pollution, particularly from:
    - **Antwerp, Belgium**: 3M's production of mainly PFOS, a 'long-chain' PFAS [5].
    - **United States:** PFAS contamination from industrial sites in Michigan (e.g., Wolverine World Wide tannery) and North Carolina (e.g., Chemours Fayetteville Works).
    - **United Kingdom:** Industrial PFAS contamination reported in various manufacturing sites, such as the contamination from the Solvay plant in West Yorkshire [6].

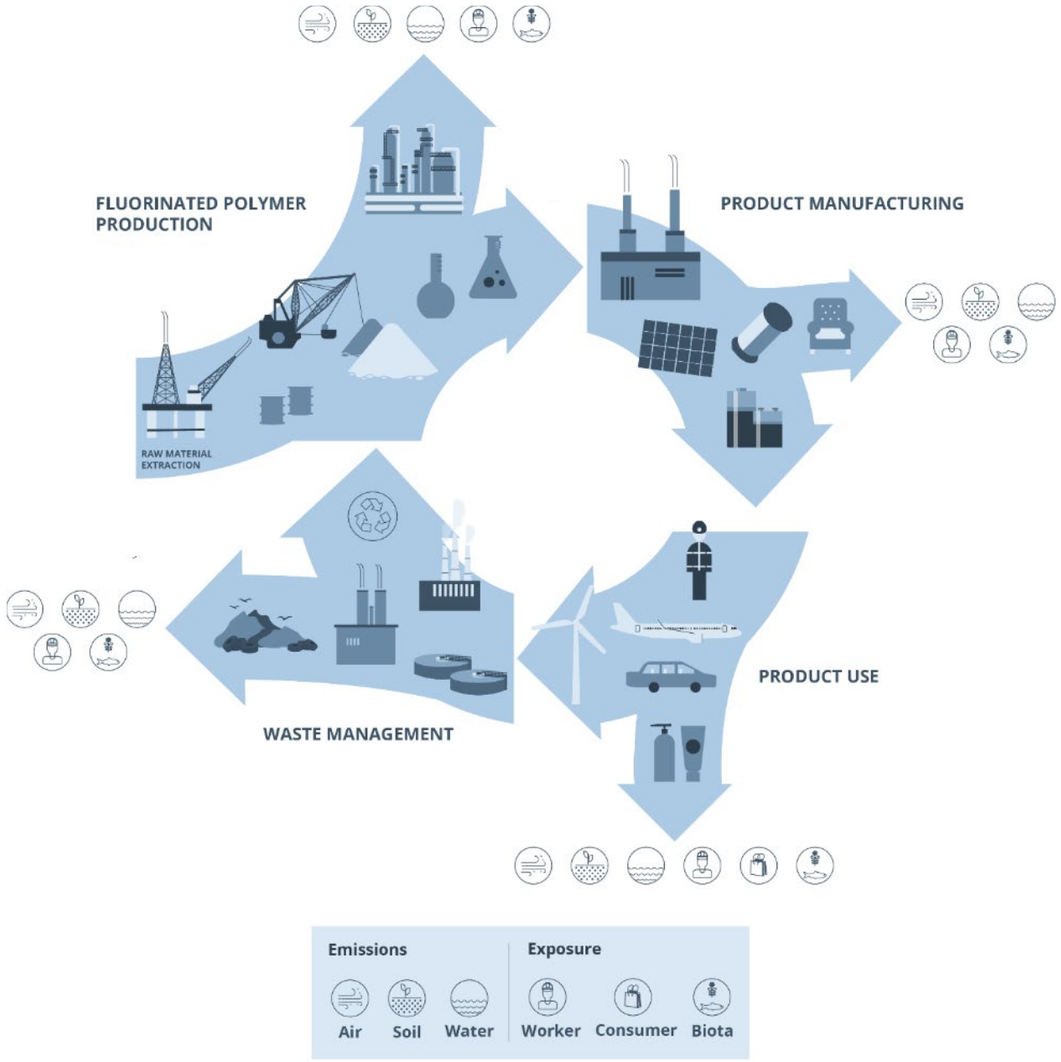


Figure 1. Life cycle of PFAS emissions [0].

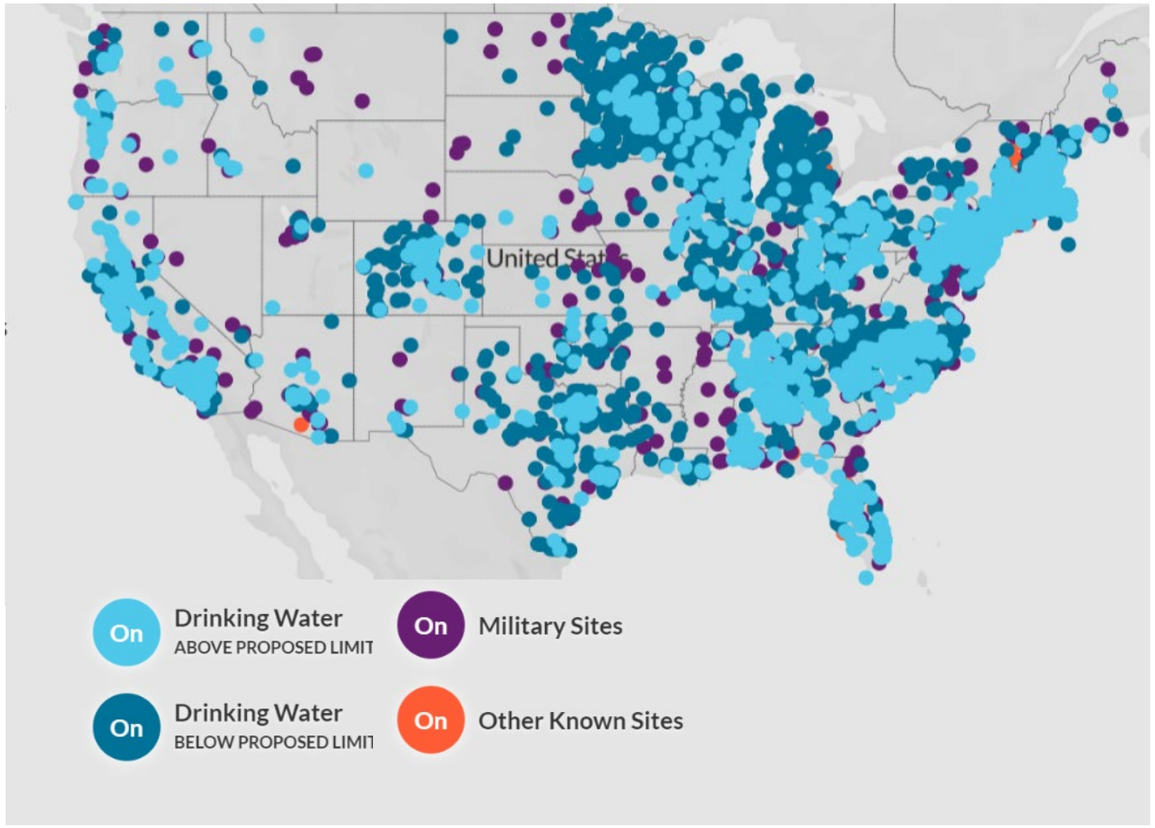
Per- and polyfluoroalkyl Substances (PFAS) and Your Health

Mapping the “Forever chemicals” Contamination Crisis Across the United States.

- **Environmental Working Group (EWG)**
  - May 2024
  - Scope: 4,621 sites (August 23), 6,189 sites (May 2024) in 50 states, the District of Columbia and four territories shows PFAS pollution in public and private water systems

- **EPA Unregulated Contaminant Monitoring Rule (UCMR)**
  - Focused on large drinking water systems
  - EPA round of public water system testing data for PFAS
  - Latest data from May, 16 2024
  - 854 sites (Nov 23), 1,593 (May 24) in 50 states
  - Check total value of PFAS in sample
  - 29 PFAS: PFPeA, PFHxS, PFOA, PFBA, PFBS, PFHpA, PFHxA, PFOS, PFNA, PFDA, PFPeS …

- **PFAS affecting the drinking water of approximately 200 million Americans**



Source: Environmental Working Group PFAS Contamination in the U.S. (May 21, 2024)

The Ubiquitous Threat of PFAS Contamination

Assessing the Scale of Perfluoroalkyl Substance Pollution

PFAS have been detected in various environmental media and biological samples across the globe, indicating their extensive reach:

- **Wildlife:** PFAS accumulation has been found in the livers of polar bears [1]., fish[2], and in the eggs of wild birds [3], Redatory birds and mammals [8],suggesting long-range transport and food chain contamination.
- **Surface Waters**: PFOS levels in European surface waters often exceed the EU's environmental quality standards, raising concerns about water safety and aquatic life health. [5] [6] PFAS has been also found in snow and meltwater on Mt. Everest [7].
- **Atmospheric Presence:** Rainwater samples across Europe have tested positive for PFAS, indicating atmospheric deposition as a pathway for environmental dispersion. [8], [9]
- **Human Exposure:** Drinking water sources in several EU countries have been contaminated with PFAS above the limit value for individual PFAS proposed in the 2018 recast of the EU Drinking Water Directive (EC, 2017)., leading to direct human exposure through ingestion. [10]
- **Soil and Agriculture**: PFAS presence in soils can lead to uptake by crops, affecting food quality and safety [11].

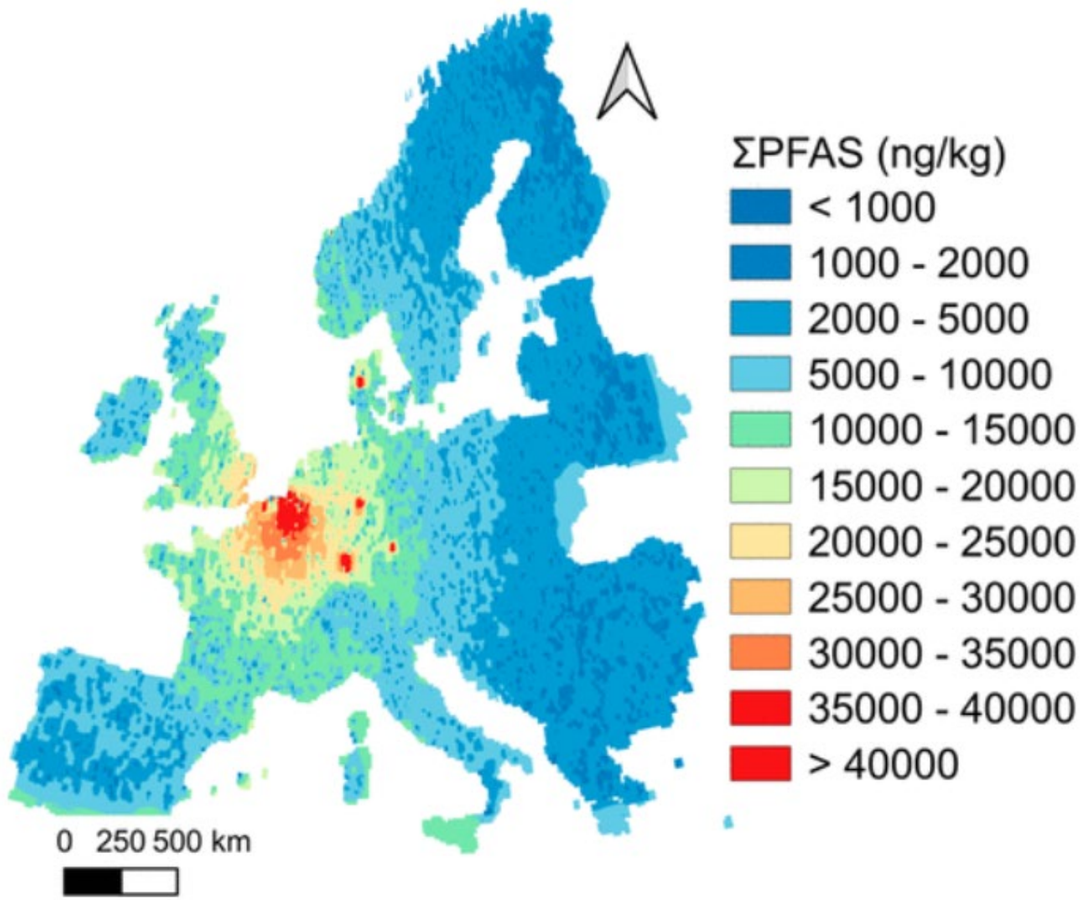


Figure 1. Geo-spatial map of predicted PFAS [∑PFAS (nanograms per kilogram)] concentrations in European soils. The different colors represent different PFAS soil concentrations [11]. Oct 2023

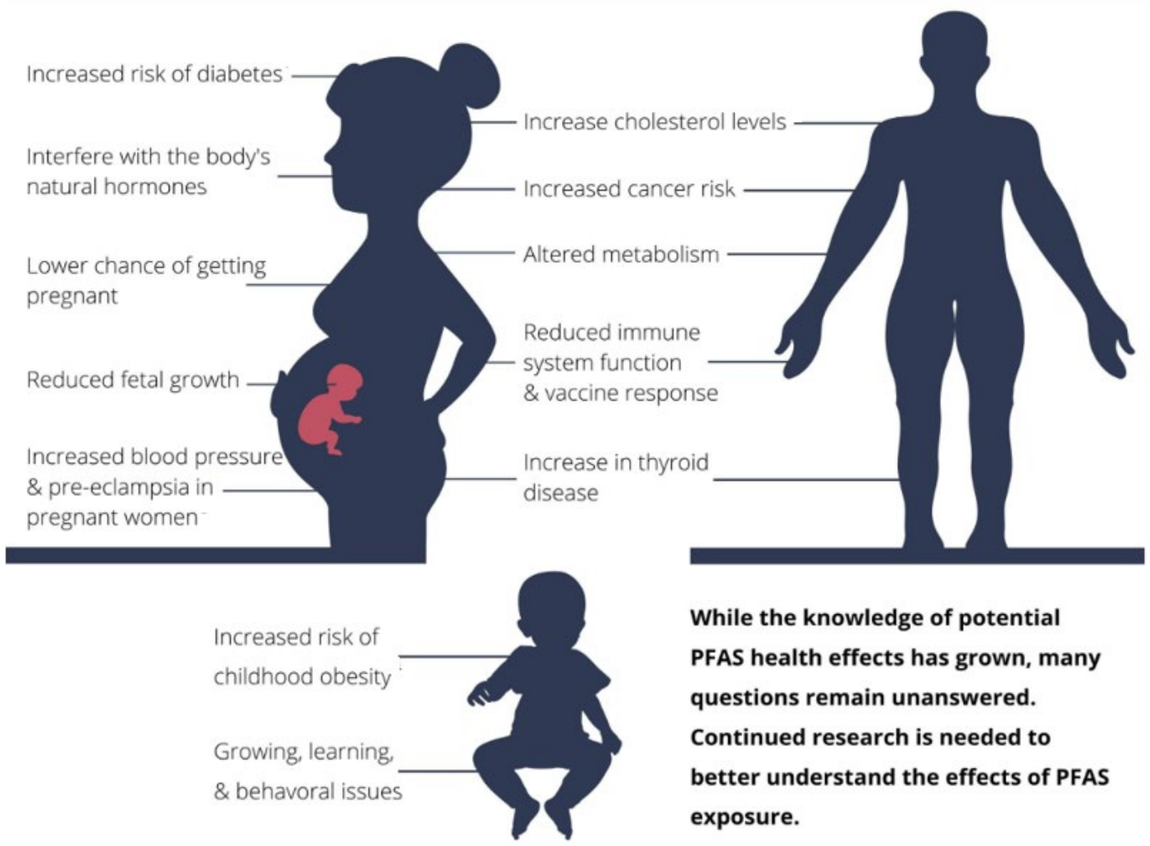
DXC TECHNOLOGY

Understanding the Risks of PFAS Exposure

The Dangers of PFAS: A Closer Look at 'Forever Chemicals'

PFAS Exposure Pathways:

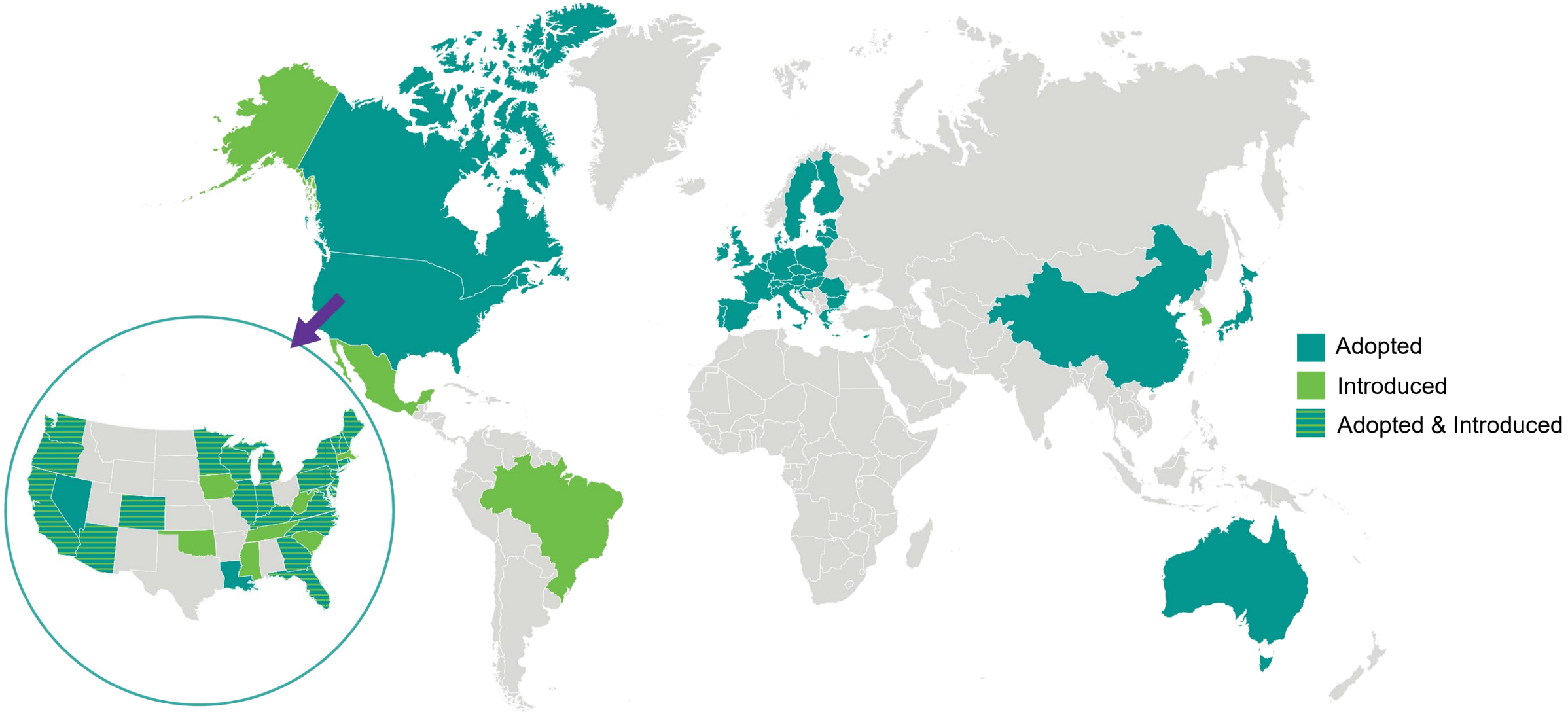
- **Human biomonitoring:** Detection of 37 PFAS in German blood plasma from 1982 to 2019 [1].
- **Brest milk Analysis**: Presence of PFOA, PFNA, and PFHxA in samples from Spain [2].
- **Economic Impact:** Estimated annual health costs of PFAS exposure in Europe range from €52-84 billion ([3]).
  - **Health Implications:** Prolonged exposure to PFAS is linked to an accumulation in the body, potentially leading to various health issues.
  - Most at risk are workers who are in repeated contact with PFAS — either directly or via air, aerosols, dust or ingesting food during the workday [5].
  - **Research and Action:** Low detection level, hazards at lower concentrations, therfore cost-effective analytical methods needed
  - **Interesting:** Three VPs of the European Commission and Members of the European Parliament coming from a wide range of European countries have detected 7 out of 13 PFAS in their bodies with exceeded levels of concerns [4].



While the knowledge of potential PFAS health effects has grown, many questions remain unanswered. Continued research is needed to better understand the effects of PFAS exposure.

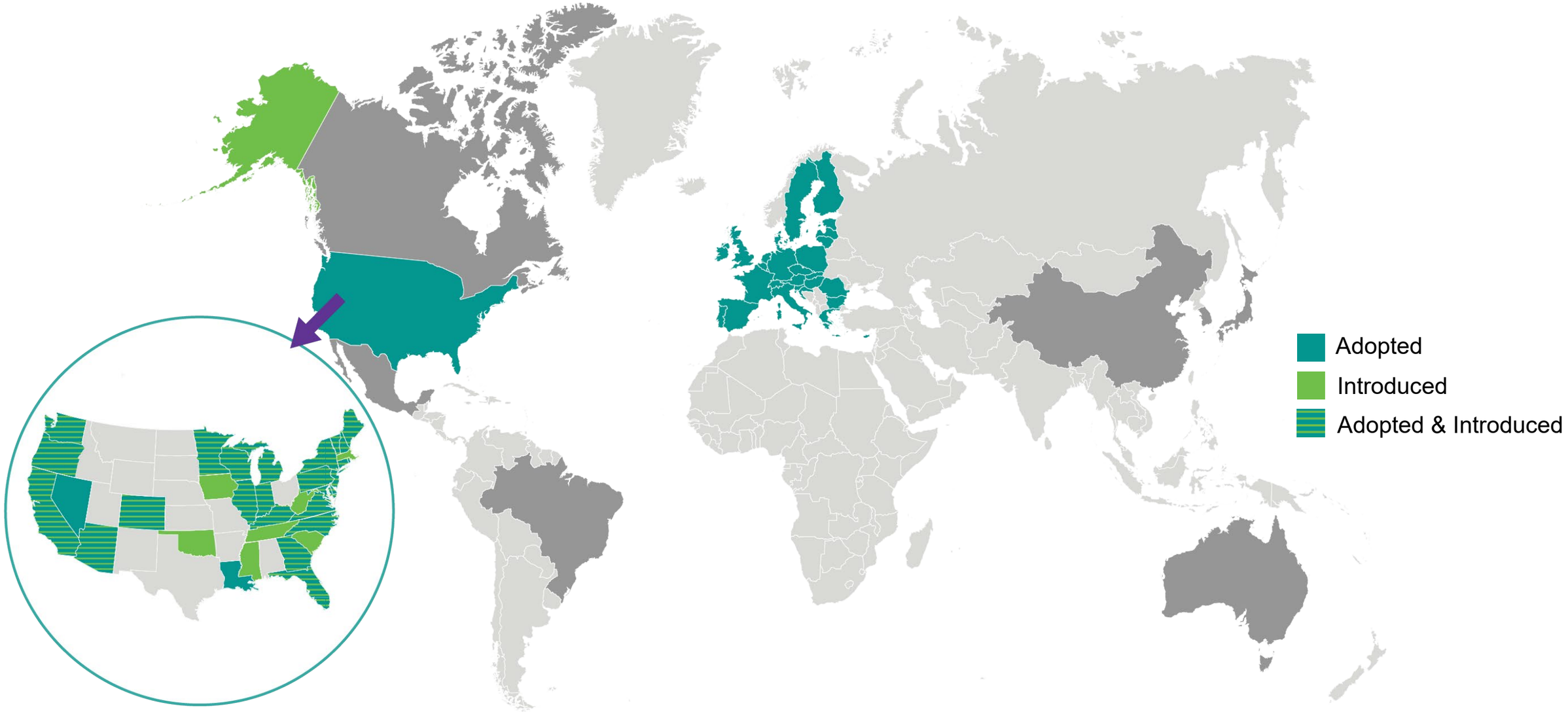
Source: https://www.wehnonline.org/pfas

PFAS Global Regulatory Landscape



DXC TECHNOLOGY

PFAS Global Regulatory Landscape



DXC TECHNOLOGY

Agenda

1. Overview of PFAS and their significance
2. In-depth analysis of the PFAS regulatory landscape in the EU
3. PFAS regulatory developments in the UK
4. The current state of PFAS regulations in the US
5. Strategies for narrowing down PFAS data collection from 15k to 3k
6. Live demonstration of the CDX System
7. Interactive Q&A session with our expert panel

DXC TECHNOLOGY

EU Persistent Organic Pollutants (POPs) Regulation

2009

28 January

Perfluorooctane sulfonic acid (PFOS), its salts, and perfluorooctane sulfonyl fluoride (PFOS-F) restricted for use in EU.

2019

10 May

Perfluorooctanoic acid (PFOA), its salts and PFOA-related added to Annex A of the Stockholm Convention

2020

9 June

Amendment to Annex I to remove all exemptions for PFOS use in the EU (e.g., metal plating and photoimaging) in EU.

2020

4 July

Perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds banned in EU.

2021

24 April

The Canadian authorities have also proposed listing long chain PFCAs as persistent organic pollutants (POPs) under the Stockholm Convention.

2023

18 August

EU lowered limit for PFOA and its salts in PTFE micro powders

2023

28 August

Perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds banned in EU.

2023

15 November

Perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds banned in UK*.

*England, Scotland, Wales

2023/24

4 December till 1 January

Consultation: The definition of PFOS and its limit values are proposed to be further revised.

DXC TECHNOLOGY

EU/UK Persistent Organic Pollutants (POPs) Regulation

Substances groups	POPs Regulation	Limits		Exemptions	
Perfluorohexane sulfonic acid (**PFHxS**), its salts, and PFHxS-related compound	Annex I	1. Where present in substances, mixtures or in articles: a) PFHxS or any of its salts: 0,025 mg/kg (0,0000025 % by weight), b) PFHxS-related compounds: ≤ 1 mg/kg (0,0001 % by weight) (sum		1. In firefighting foam mixtures that are to be used or are used in the production of other firefighting foam mixtures: a) PFHxS-related compounds ≤ 0,1 mg/kg (0,00001 % by weight) This exemption to be revised by 28 August 2026.	
Perfluorooctane sulfonic acid (**PFOS**), its salts and perfluorooctane sulfonyl fluoride (PFOSF)	Annex I Under amendment	**Currently:** 1. Where it is present in substances, mixtures: a) PFOS and its salts ≤ 10 mg/kg; 2. Semi-finished products or articles or parts: a) PFOS < 1 mg/kg (sum); 3. Mass of structurally or micro-structurally distinct parts that contain PFOS or, for textiles or other coated materials: <1µg/m2	**Proposed:** 1. Where it is present in substances, mixtures: a) PFOS or any of its salts: ≤ 0,025 mg/kg (0,0000025 % by weight) b) PFOS-related compounds ≤ 1 mg/kg (0,0001 % by weight) (sum);	**Currently:** Use as mist suppressant for non-decorative hard chromium (VI) plating in closed loop systems.	**Proposed:** Removal exemption.
Perfluorooctanoic acid (**PFOA**), its salts and PFOA-related compounds	Annex I Amendment (as of 18 August 2023)	1. Where present in substances, mixtures or in articles: a) PFOA or any of its salts ≤ 0.025 mg/kg (0.0000025 % by weight) b) PFOA-related compound or a combination of PFOA-related compounds ≤ 1 mg/kg (0,0001 % by weight) 2. Apply to manufacture, placing on the market and use of PFOA and its salts where they are present in PTFE micropowders a) PFOA or any of its salts: ≤ 1 mg/kg (0,0001 % by weight) 3. W|here present in PTFE micropowders that are transported or treated: a) PFOA or any of its salts: < 0.025 mg/kg (0.0000025 % by weight)		1. Where present in a substance to be used as a transported isolated intermediate: a) PFOA-related compounds ≤ 20 mg/kg (0,002 % by weight) 2. Photolithography or etch processes in semiconductor manufacturing, until 4 July 2025; 3. Photographic coatings applied to films, until 4 July 2025; 4. Invasive and implantable medical devices, until 4 July 2025; 5. With certain conditions, PFOA, its salts and PFOA-related compounds shall be allowed in fire-fighting foam for liquid fuel vapour suppression and liquid fuel fire (Class B fires) already installed in systems, including both mobile and fixed systems , until 4 July 2025, 6. The use of perfluooroctyl bromide containing perfluoroctyl iodide for the purpose of producing pharmaceutical products shall be allowed.	
Long-chain (C9–C21) perfluorocarboxylic acids (**PFCAs**), their salts and related compounds	Under consideration for Stockholm Convention	**Proposed:** 1. When present in polytetrafluoroethylene (PTFE) micro: a) C9−C21 PFCA powders: ≤ 1 mg/kg (0,0001% by weight) 2. Transported or treated for the purpose to reduce the concentration a) C9−C21 PFCAs and its salts < 0,250 mg/kg (0,0000250% by weight		**Proposed:** 1. No exemptions or, 2. Certain applications to allow sufficient time to identify, and transition to, suitable alternatives	

DXC TECHNOLOGY

EU Substance of Very High Concern (SVHC)

2012

12 December

Henicosafluoroundecanoic acid (PFUnDA)
Tricosafluorododecanoic acid (PFDoDA)
Pentacosafluorotridecanoic acid (PFTrDA)
Heptacosafluorotetradecanoic acid (PFTeDA)
Scope: vPvB (Article 57e)

2013

20 June

Pentadecafluorooctanoic acid (PFOA)
Scope:
1. Toxic for reproduction (Article 57c)
2. PBT (Article 57d)

2015

17 December

Perfluorononan-1-oic-acid and its sodium and ammonium salts (PFNA)
Scope:
1. Toxic for reproduction (Article 57c)
2. PBT (Article 57d)

2019

16 July

HFPO-DA (GenX) its salts and its acyl halides
Scope: ELoC* having probable serious effects to human health and environment (Article 57f)

2017

7 July

Perfluorohexane-1-sulphonic acid and its salts (PFHxS)
Scope: vPvB (Article 57e)

2017

12 January

Nonadecafluorodecanoic acid (PFDA) and its sodium and ammonium salts
Scope:
1. Toxic for reproduction (Article 57c)
2. PBT (Article 57d)

2020

16 January

Perfluorobutane sulfonic acid (PFBS) and its salts
Scope: ELoC* having probable serious effects to human health and environment (Article 57f)

2023

17 January

Perfluorohexane sulfonic acid (PFHpA), its salts, related compound
Scope:
1. Toxic for reproduction (Article 57c)
2. PBT (Article 57d)
3. vPvB (Article 57e)
4. ELoC* having probable serious effects to human health and environment (Article 57f)

Reaction mass of 2,2,3,3,5,5,6,6-octafluoro-4-(1,1,1,2,3,3,3-heptafluoropropan-2-yl)morpholine and 2,2,3,3,5,5,6,6-octafluoro-4-(heptafluoropropyl)morpholine
Scope: vPvB (Article 57e)

* ELoC Equivalent level of concern

DXC TECHNOLOGY

Overview of REACH Annex XVII Restrictions

Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Entry 68: Restricted substances

- Linear and branched perfluorocarboxylic acids of the formula CnF2n +1-C(= O)OH where n = 8, 9, 10, 11, 12, or 13 (C9-C14 PFCAs), including their salts, and any combinations.
- C9-C14 PFCA-related substance having a perfluoro group with the formula CnF2n +1- directly attached to another carbon atom, where n = 8, 9, 10, 11, 12, or 13, including their salts and any combinations.
- Any C9-C14 PFCA-related substance having a perfluoro group with the formula CnF2n +1- that it is not directly attached to another carbon atom, where n = 9, 10, 11, 12, 13 or 14 as one of the structural elements, including their salts and any combinations.

The following substances are excluded from this designation
- CnF2n +1-X, where X = F, Cl, or Br where n = 9, 10, 11, 12, 13 or 14, including any combinations thereof, -
- CnF2n +1-C(= O)OX' where n> 13 and X'=any group, including salts.

Conditions of restriction

Manufacture and Market Placement: These substances shall not be manufactured,or placed on the market as substances on their own from February 25, 2023.

Use in Products: From February 25, 2023, they shall not be used in, or placed on the market in another substance as a constituent, a mixture, or an article, except if the concentration in the substance, the mixture, or the article is below 25 ppb for the sum of C9-C14 PFCAs and their salts or 260 ppb for the sum of C9-C14 PFCA-related substances.

Derogations: There are specific derogations for concentrations up to 10 ppm for the sum of C9-C14 PFCAs, their salts, and C9-C14 PFCA-related substances in certain conditions, and additional specific uses are allowed until July 4, 2025, for certain applications such as photolithography or etch processes in semiconductor manufacturing, photographic coatings applied to films, invasive and implantable medical devices, and fire-fighting foam for liquid fuel vapor suppression and liquid fuel fire.

14 June 2017
Regulation (EU) 2017/1000 was published, adding PFOA, its salts, and PFOA-related substances under Entry 68

4 July 2020
The official transition for PFOA from REACH Annex XVII to the POP Regulation.

5 August 2021
Annex XVII updated to include C9-C14 PFCAs, their salts, and related substances

7 February 2023
The universal PFAS restriction proposal

25 February 2023
The manufacture,or placing on the market of C9-C14 PFCAs, their salts, and related substances as substances on their own was prohibited.

20 June 2023
The EC submitted a draft regulation to the World Trade Organization (WTO) to restrict PFHxA and its derivatives

DXC TECHNOLOGY

„Universal” PFAS restriction in EU

- Restriction on 27 EU Member States and EEA (Iceland, Liechtenstein, and Norway)
- Reminder: EEA countries must adopt regulation but do not have a formal vote in the EU's decision-making bodies
- Propose restriction for around 10,000 PFAS and it is there to address their persistence nature so contaminating water sources and causing toxic accumulation in human, animals and plants.
- Proposal has been led by Denmark, Germany, the Netherlands, Norway and Sweden.

Universal PFAS restriction proposal

Ban of manufacture, placing on the market and all uses PFASs as such, as constituent **in other substances or in mixtures as well as in articles**, except of firefighting foams (addressed in another restriction proposal)

Not meant to affect other restrictions already included in REACH or prohibits in the other appliable EU legislation (i.e. POPs)

Key Features of the Proposal:

Restriction Options: RO1 and RO2
Derogations: For RO2 only
Thresholds: The RO2 sets concentration limits for PFASs in substances, mixtures, and articles.
- ≤ 25 ppb for any PFAS (except polymeric PFASs) (equals to 25 µg/kg),
- ≤ 250 ppb for the sum of PFASs (equals to 250 µg/kg), optionally with prior degradation of precursors, and
- ≤ 50 ppm for PFASs, including polymeric PFASs (equals to 50 mg/kg).

RO1: Full PFAS Ban	RO2: Ban with use specific derogations
Transition period 18 months, before RO takes effect	
No Derogation, applies to all PFASs without exceptions	**5 years after transition period ends:** • possible alternatives in the development phase. • known alternatives are not available in sufficient quantities or cannot be implemented before the transition period ends **12 years after transition period ends:** • non-existence alternatives • certification or regulatory approval of PFAS-free alternatives cannot be achieved within a five-year derogation period.

DXC TECHNOLOGY

Navigating the PFAS Ban: EU's Regulatory Journey

Key Milestones in the European Union's Path to Restricting PFAS

1

13 January 2023

Preparation and Submission of a Restriction Proposal

Authorities **in Denmark, Germany, the Netherlands, Norway, and Sweden** prepared and submitted the PFAS restriction proposal to ECHA

7 February 2023

ECHA published the proposal and supporting documents on its website.

2

13-17 March 2023
22 March 2023

Evaluation and Public Consultation

- **ECHA's Evaluation**: ECHA's scientific committees for Risk Assessment (RAC) and Socio-Economic Analysis (SEAC) evaluate the proposal.
- **Public Consultation**: Interested parties may submit comments on them or on any supporting documents within six months of the date of publication.

5 April 2023

Online information session to explain the restriction process

3

22 September 2023

Public Consultation ends

- The public consultation received 5,642 comments, with non-confidential comments publicly available.
- Commented by more than 4,400 organizations, companies and individuals
- around 6,300 attachments with In total 100 000 pages

DXC TECHNOLOGY

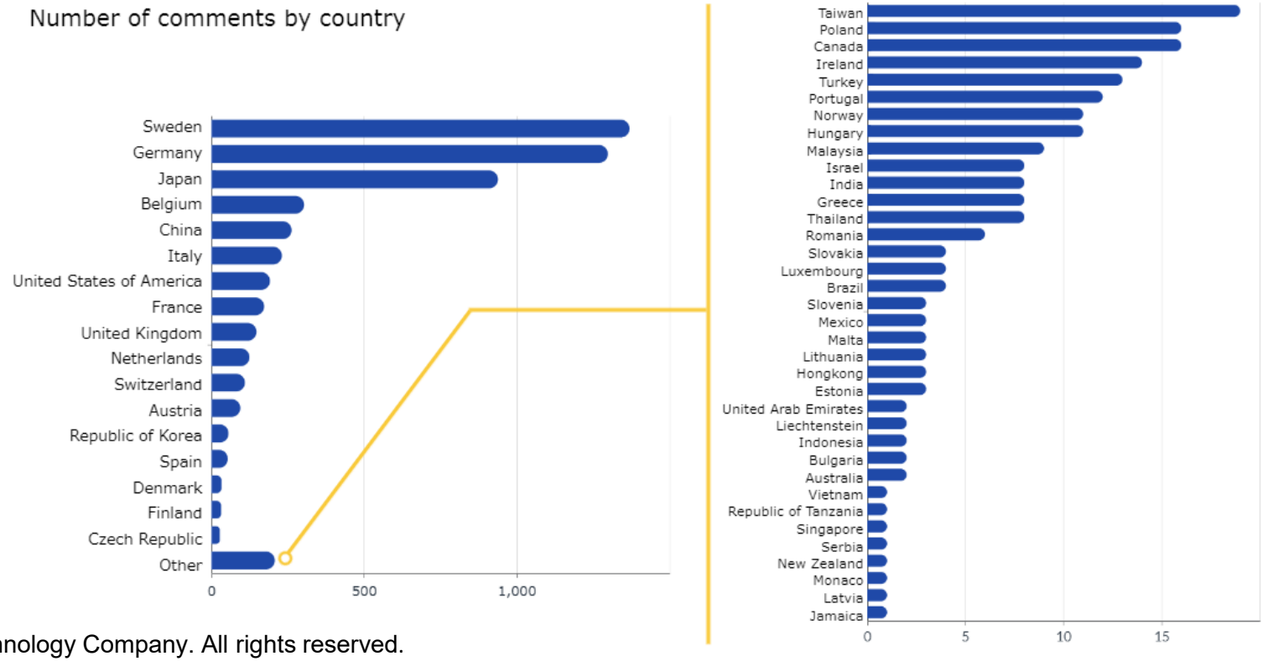
Summary of Feedback on PFAS Ban Consultation

Comprehensive Analysis of Global Stakeholder Input

Consultation Outcomes:

- **Volume of Feedback:** Received 5,642 comments and over 6,400 attachments, totaling approximately 100,000 pages of documentation.
- **Source of Comments:** Contributions from a diverse group of over 4,400 stakeholders including organizations, companies, and individuals.
- **Key concerns raised include:**
  - Health and environmental risks associated with PFAS.
  - Socio-economic impacts of a potential ban.
  - Availability and effectiveness of alternative substances to PFAS.
- **Types of consultees**:
  - Companies: 58.7%
  - Individuals: 27.3%
  - Industry or Trade Associations: 9.8%
  - Other Stakeholders: 4.1% (Including academia, national/local/regional authorities, NGOs, and international organizations)

- **Type of Countries:**
  - Notable participation from individuals in Sweden, influenced by a national campaign organized by the Swedish Society for Nature Conservation.
  - Contributions received from an almost equal number of EU and non-EU countries.



DXC TECHNOLOGY

Navigating the PFAS Ban: EU's Regulatory Journey

Key Milestones in the European Union's Path to Restricting PFAS

1

13 January 2023

Preparation and Submission of a Restriction Proposal

Authorities **in Denmark, Germany, the Netherlands, Norway, and Sweden** prepared and submitted the PFAS restriction proposal to ECHA

7 February 2023

ECHA published the proposal and supporting documents on its website.

2

13-17 March 2023

22 March 2023

Evaluation and Public Consultation

- **ECHA's Evaluation**: ECHA's scientific committees for Risk Assessment (RAC) and Socio-Economic Analysis (SEAC) evaluate the proposal.
- **Public Consultation**: Interested parties may submit comments on them or on any supporting documents within six months of the date of publication.

5 April 2023

Online information session to explain the restriction process

3

22 September 2023

Public Consultation ends

- The public consultation received 5,642 comments, with non-confidential comments publicly available.
- Commented by more than 4,400 organizations, companies and individuals
- around 6,300 attachments with In total 100,000 pages

6-9 June 2024

European Parliament election

4

2023 - 2026?

Consultation review

- **December 2023** - ECHA segregated comments into categories.
- **March 2024 –** Plenary meeting to focus on evaluation of certain PFAS uses with the lowest number of comments.
- **RAC and SEAC sector group meetings** (e.g. Metal plating & manufacture of metal products, Textiles, Food contact materials etc) expected 2025, possibly into 2026**.**
- **In parallel five national authorities** who prepared proposal will update their initial report to address consultation comments
- **Next:** Timeline, RAC and SEAC opinions are submitted to EC.

5

Initially 2026/2030?

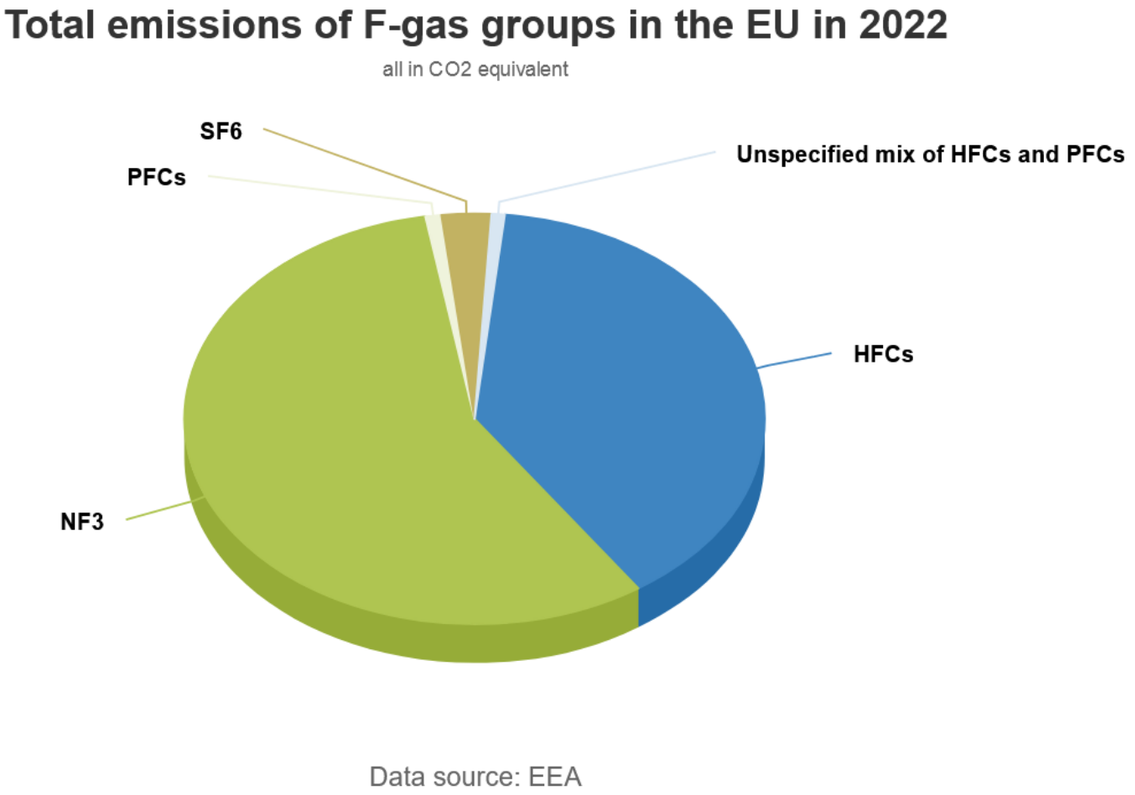
Finalization

- The European Commission, with EU Member States, decides on the restriction.
- The PFAS restriction is expected to be enforced.

DXC TECHNOLOGY

F-gases

- Fluorinated greenhouse gases (F-Gas) are very high global warming potential substances, introduced largely to replace ozone depleting substances
- Used in refrigeration, air conditioning, heat pumps, medical inhalers & aerosols
- 2014 EU F-Gas Regulation introduced quotas to reduce F-Gas consumption, as well as bans F-Gas & uses of F-Gas, as well as requirements on leak rates from equipment and substitution to climate friendly alternatives
- F-gas Regulation (EU) 2024/573 entered into force on 11th March 2024 and builds on predecessor regulation to implement a quota system to reduce amounts of F-Gas, in conjunction with additional prohibitions, emissions restrictions and capping of EU production to lead to a complete phase out by 2050

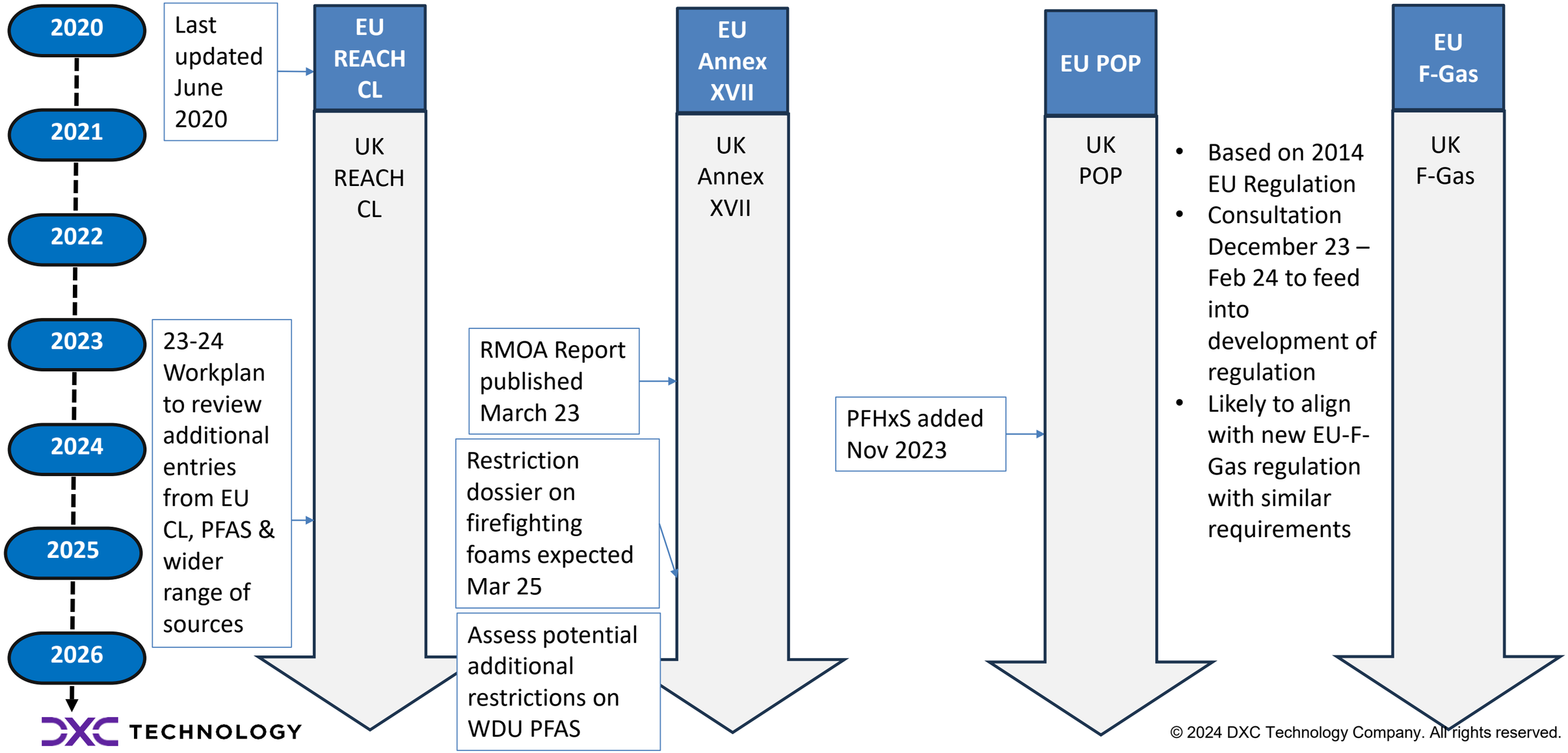


Agenda

1. Overview of PFAS and their significance
2. In-depth analysis of the PFAS regulatory landscape in the EU
3. PFAS regulatory developments in the UK
4. The current state of PFAS regulations in the US
5. Strategies for narrowing down PFAS data collection from 15k to 3k
6. Live demonstration of the CDX System
7. Interactive Q&A session with our expert panel

DXC TECHNOLOGY

PFAS Regulatory Landscape in UK



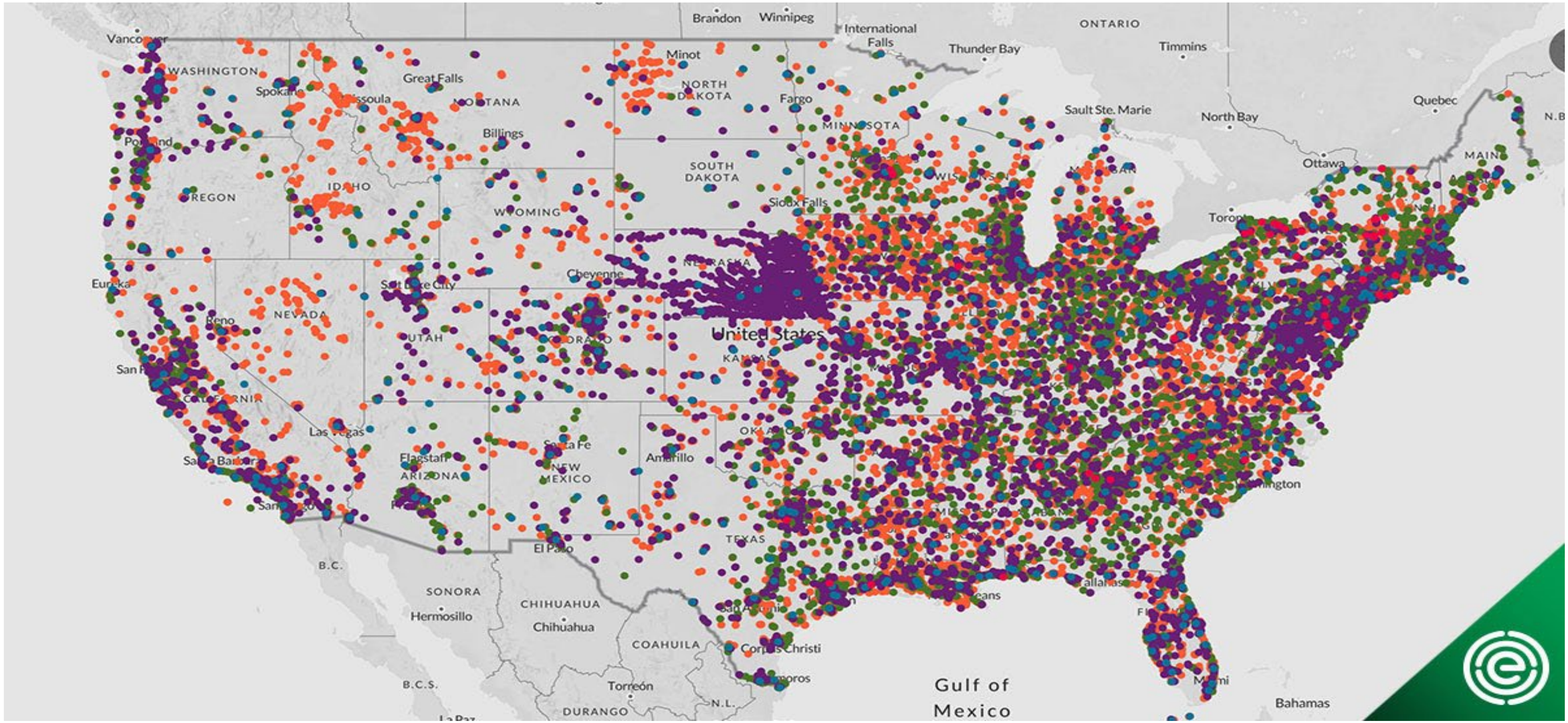
DXC TECHNOLOGY

Agenda

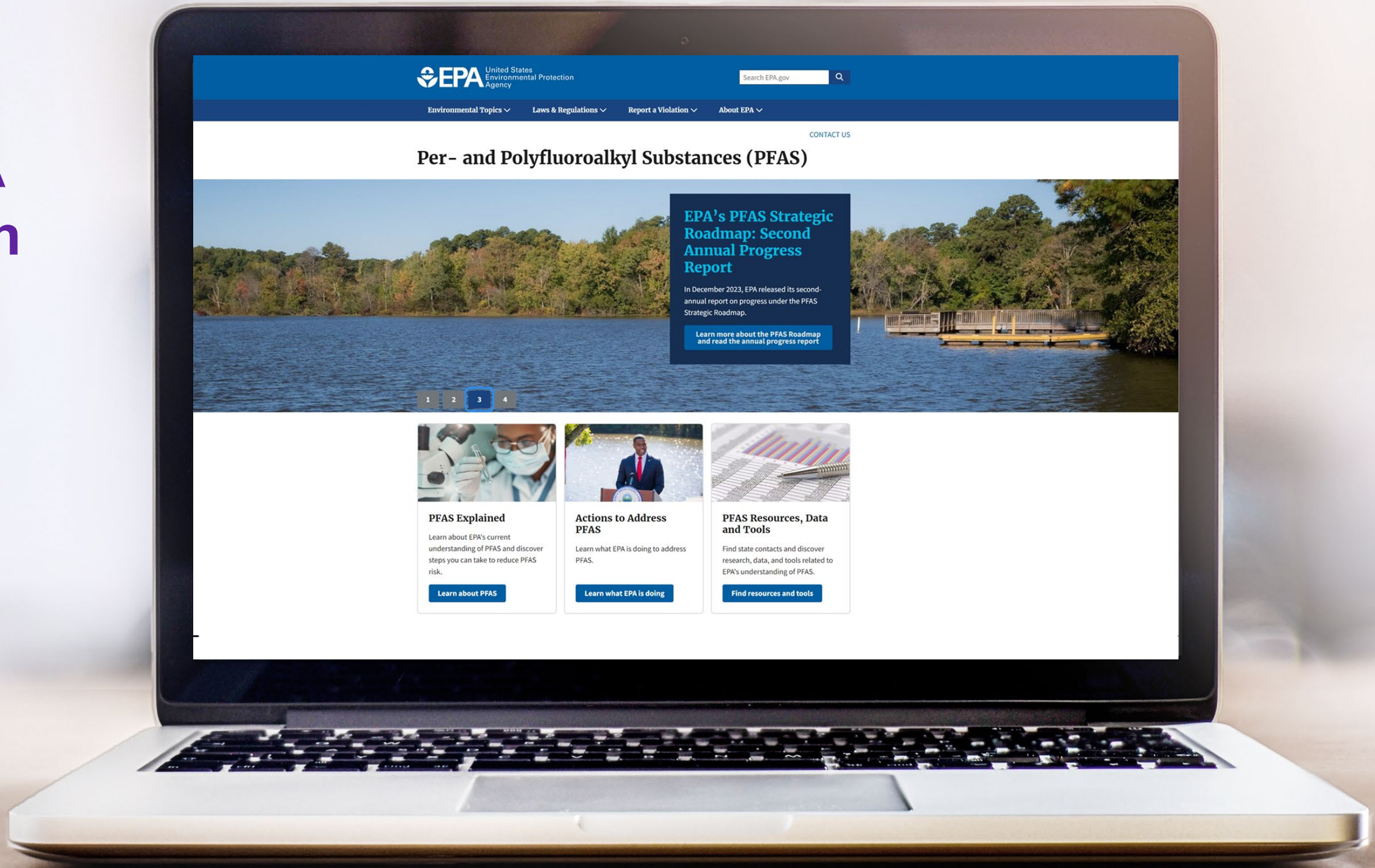
1. Overview of PFAS and their significance
2. In-depth analysis of the PFAS regulatory landscape in the EU
3. PFAS regulatory developments in the UK
4. The current state of PFAS regulations in the US
5. Strategies for narrowing down PFAS data collection from 15k to 3k
6. Live demonstration of the CDX System
7. Interactive Q&A session with our expert panel

DXC TECHNOLOGY

Known or Suspected Industrial Discharges of PFAS in USA



PFAS as an U.S. EPA Remediation Topic



DXC TECHNOLOGY

https://www.epa.gov/pfas

EPA Announces multiple PFAS-Related Actions

Proposed Resource Conservation and Recovery Act PFAS-Related Rules

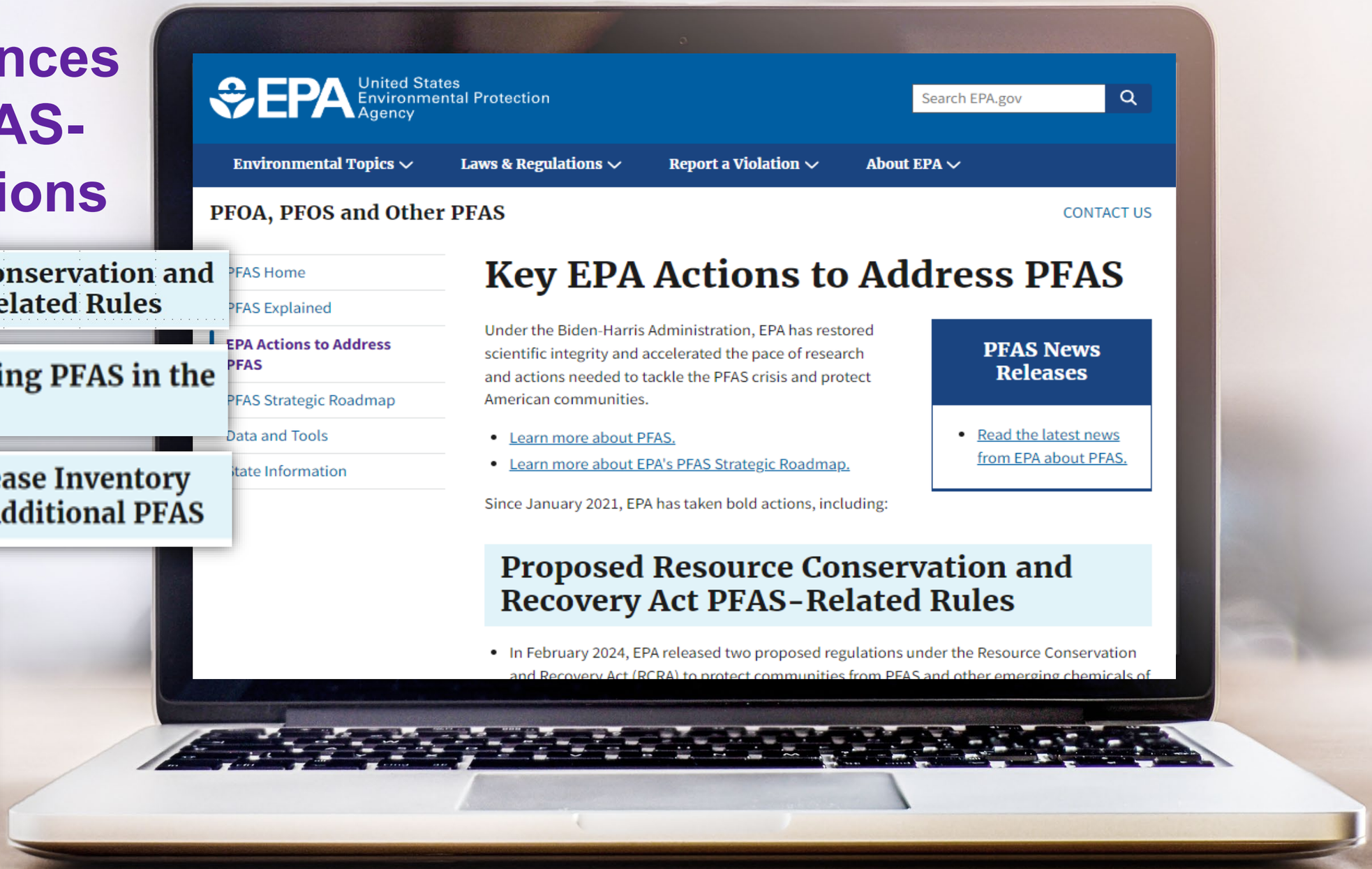
Methods for Measuring PFAS in the Environment

Requiring Toxics Release Inventory Reporting for Seven Additional PFAS

EPA's PFAS Strategic Roadmap: Second Annual Progress Report

In December 2023, EPA released its second-annual report on progress under the PFAS Strategic Roadmap.

Learn more about the PFAS Roadmap and read the annual progress report



DXC TECHNOLOGY

https://www.epa.gov/pfas/key-epa-actions-address-pfas

EPA Enacts National Primary Drinking Water PFAS Regulation

"…EPA expects that over many years the final rule will prevent PFAS exposure in drinking water for approx. 100 million people, **prevent thousands of deaths**, and **reduce tens of thousands of serious PFAS-attributable illnesses**."

https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas

PFAS shows need for IP-protected Full Material Declarations

FMD, i.e. IMDS-style reporting, offers the most benefits

- The greatest capability for data validation
- A measure of future-proofing against new or changed regulations
- Maximizes sustainability benefits beyond risk avoidance
- Reduce total cost & effort necessary to maintain product compliance

Declarations to a regulation or DSL scope

- Have limited value when regulations and/or products change
- Require constant re-solicitation of supply chain to remain updated to last year's requirements

One-level declarations often lack due diligence

- Salesman: What answer do I give so you buy my product?

DXC TECHNOLOGY

How PFAS can appear or be removed without your knowledge

Compliance is a moving target, regulations add/change often	Products need to be recertified Products need to be adapted / re-designed	Full Material Disclosure (FMD) is the strongest mitigation solution for this risk
Product specifications change throughout the supply chain	Products need to be recertified Types need to be recertified / re-approved	For complex products, changes several layers down may not be obvious at the finished product layer
Supplier parts change: design and/or specs govern change	Products need to be re-certified Products need to be adapted / re-designed to resolve changes	All this needs current maintained information from the supply chain
There are only reliable two ways to obtain the needed information:	Test samples of the finished product, or obtain answers from the source	

Agenda

1. Overview of PFAS and their significance
2. In-depth analysis of the PFAS regulatory landscape in the EU
3. PFAS regulatory developments in the UK
4. The current state of PFAS regulations in the US
5. Strategies for narrowing down PFAS data collection from 15k to 3k
6. Live demonstration of the CDX System
7. Interactive Q&A session with our expert panel

DXC TECHNOLOGY

Strategies for narrow down PFAS Data Collection

Challenges associated with PFAS Compliance

- Definition of PFAS is not universal
- Technically challenging to build substance lists based on a common functional group:
  - Not all chemical inventories contain molecular formulas or chemical names to identify relevant functional groups
  - Many PFAS are polymers or mixtures which may not have molecular formulas available
  - Substances may be confidential and precise chemistry unavailable
  - Large resource burden as potential scope is >10,000+ substances

→ As a result, industry heavily reliant on regulatory / international bodies to provide lists of PFAS

PFAS Lists in CDX

1. R-(CF_2)-CF(R′)R″, where both the CF_2 and CF moieties are saturated carbons.
2. R-CF_2OCF_2-R′, where R and R′ can either be F, O, or saturated carbons.
3. $CF_3C(CF_3)$R′R″, where R′ and R″ can either be F or saturated carbons.

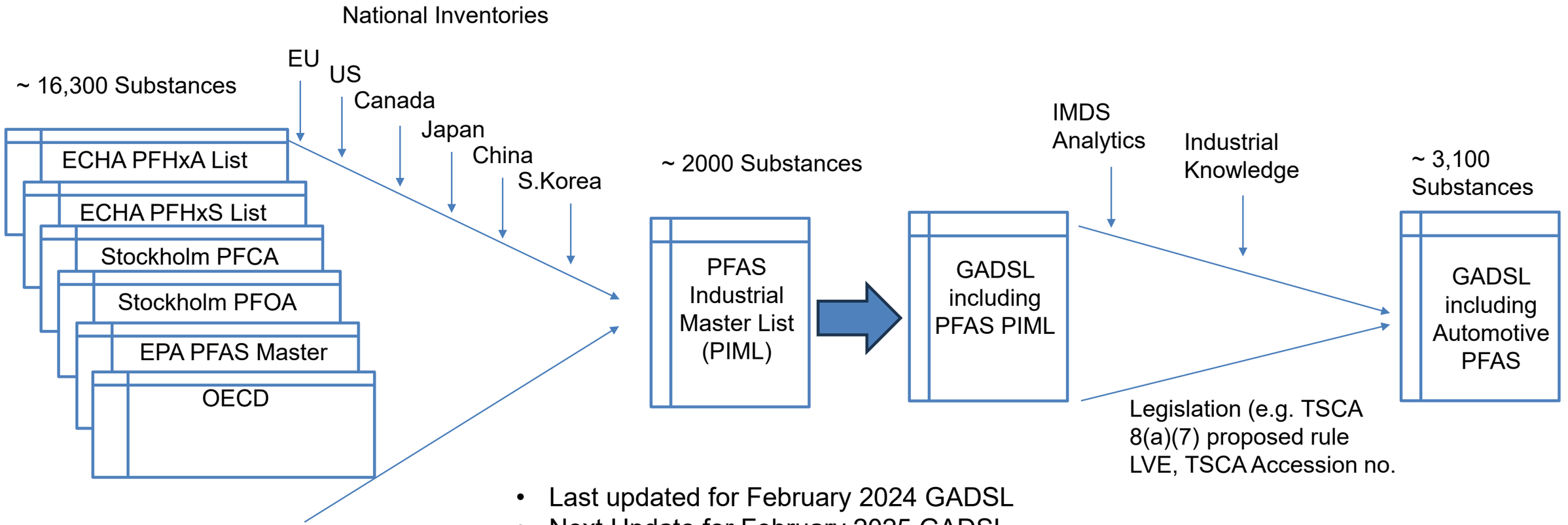
- **TSCA Section 8a(7)**
  - Based on EPA derived lists of PFAS that meet the definition
  - List developed from Proposed rule document which lists PFAS by CAS, LVE and TSCA Accession number; EPA list on CompTox, and public list of PFAS published by EPA on TSCA website.
  - 11,466 substances

- **PFAS Declarable Substance List**
  - Based on automotive industries GADSL list & approach to PFAS compliance

Strategies for narrow down PFAS Data Collection

Assessment of Global Industrial Relevance

Addition to GADSL



- Last updated for February 2024 GADSL
- Next Update for February 2025 GADSL
- ~ 300 PFAS in IMDS with hits >1

DXC TECHNOLOGY