PFAS Around The World – Regulatory Update and Considerations For PFAS In Supply Chain Management

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Agenda

- General introduction to PFAS
- Best Practices for Leveraging your Supply Chain and Analyzing Impact
- Questions

Per- and polyfluoroalkyl substances, PFAS

A little bit of background on Forever Chemicals

Regulatory History & Voluntary Phaseout

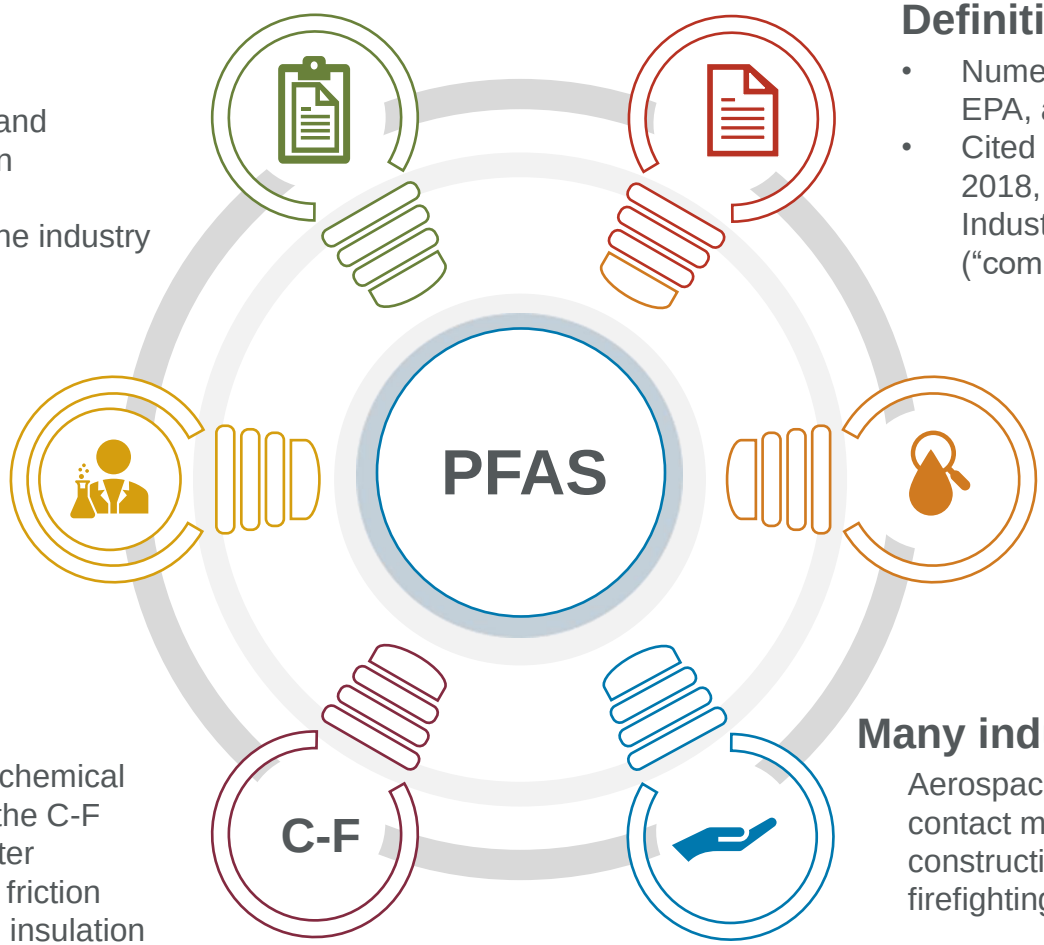
- International (Stockholm) and national/regional regulation
- Regrettable substitution
- Voluntary initiatives from the industry

Properties of concern[1]

- All PFAS: Very high persistence
  → Forever chemicals
- Some (studied) PFAS: high Bioaccumulation & mobility, difficult removal, and toxic effects in humans & environment incl. long-range potential

Unique Properties

- Unique physical and chemical properties based on the C-F bond e.g., oil and water repellency, durability, friction reduction, surfactant, insulation



Definitions & Number of PFAS

- Numerous definitions exist by OECD, US EPA, and others
- Cited numbers greatly vary, 4730 OECD[2], 2018, today mostly close to ten thousand[1]; Industry paper: more in the hundreds ("commercially relevant")[2]

Emission & Monitoring

- High number of contamination sites in the US & EU
- Biomonitoring in DE shows "substantial exposure" of children[4]
- Emissions of 75000 t in 2020[1]

Many industrial & commercial usages

Aerospace and defense, automotive, aviation, food contact materials, textiles, leather and apparel, construction and household products, electronics, firefighting, food processing, & medical articles

[1] Media Briefing 2023 – The PFAS restriction proposal
[2] OECD 2018
[3] Buck et al. 2021
[4] Duffek et al. 2020 – GerES V

PFAS definitions

Differences across regions and even amongg states

OECD

*"Any substance that contains at least **one fully fluorinated methyl** (CF3-) or methylene (-CF2-) carbon atom (without any H/Cl/Br/I attached to it)."*

https://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/terminology-per-and-polyfluoroalkyl-substances.pdf

US EPA (national testing strategy)

*"chemicals with at least **two adjacent carbon atoms**, where one carbon is fully fluorinated and the other is at least partially fluorinated"*

https://www.epa.gov/system/files/documents/2021-10/pfas-natl-test-strategy.pdf

US Maine

*"substances that include any member of the class of fluorinated organic chemicals containing **at least one fully fluorinated** carbon atom."*

https://www.maine.gov/dep/spills/topics/pfas/PFAS-products/

Why one or two fully fluorinated carbon? It is about Trifluoroacetic acid (TFA) …
US EPA "most substances with only one terminal carbon (-CF3) are expected to degrade to Trifluoroacetic acid, which is a well-studied non-PFAS". However, in OECD def included.

Challenges around PFAS

What do we hear from our clients

Identification of PFAS; many lists but regulations mainly only include structural info
→ no CAS

Where to start / Staying on top of things…
Many global regulations on different levels
- ✓ Substance
- ✓ Articles/products
- ✓ Universal

PFAS as a reputation & liability issue… The topic is also asked by customers, investors, insurance

Difficulties surrounding communication in the supply chain (partially) based on confidentiality

Legislations use different “PFAS” definitions and concentrations thresholds

Europe

Proposed universal REACH restriction

Current EU Regulations on PFAS

- Stockholm Convention and & POP (Regulation (EU) 2019/1021):
  - PFOS & PFOA
  - PFHxS: Included in Stockholm but not yet in POP reg (planned for ´23)
  - C9-21 PFCAs: POP-Candidate
- REACH (Regulation (EC) No 1907/2006)
  - Restriction in place: C9-14 PFCAs
  - Restriction proposed: PFHxS, PFHxA, PFAS in firefighting foam, **universal PFAS covering a wide range of uses**
  - SVHC: PFOA, C9-14 PFCAs, PFHxS, GenX, PFBS, PFHpA
  - Several PFAS on CoRAP (Community rolling action plan)
- CLP (Regulation (EC) No 1272/2008)
  - CLH: PFHpA, PFOA and APFO, PFNA, PFDA
  - Intension for CLH: 6:2 FTOH

Some PFAS compounds are already now regulated in the EU (e.g., POP, REACH, CLP)

https://echa.europa.eu/hot-topics/perfluoroalkyl-chemicals-pfas

Motivation as laid out in the CSS

Commission Communication on the Chemicals Strategy for Sustainability (CSS) 2020

https://environment.ec.europa.eu/strategy/chemicals-strategy_en

PFAS

"require special attention, considering the large number of cases of contamination of soil and water - including drinking water - in the EU and globally, the number of people affected with a full spectrum of illnesses and the related societal and economic costs."

Aim to ensure "*that the use of PFAS is phased out in the EU unless it is proven essential for society.*"

PFAS Action plan

Commission Communication on the Chemicals Strategy for Sustainability (CSS) 2020

- Comprehensive set of actions to address the use of and contamination with PFAS
  - **ban all PFAS as a group in fire-fighting foams as well as in other uses, allowing their use only where they are essential for society;**
  - address PFAS with a group approach under relevant legislation on water, sustainable products, food, industrial emissions, and waste;
  - address PFAS concerns on a global scale through the relevant international fora and in bilateral policy dialogues with third countries;
  - establish an EU-wide approach and provide financial support under research and innovation programs to identify and develop innovative methodologies for remediating PFAS contamination in the environment and in products;
  - provide research and innovation funding for safe innovations to substitute PFAS under Horizon Europe

https://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/webinars/#d.en.418532

The Universal PFAS REACH restriction

Overview

Proposal

- Final publication on the 22nd of March 2023
- Annex XV Report, 7 Annexes, and 3 Appendices (± 2000 pages in total)
- The ban aims to reduce the release of PFASs into the environment drastically

Scope

- Ban on manufacturing, sale, use, and import of
  - all PFAS
  - PFAS-containing products
  - Materials, and finished goods

Restriction options

- A full ban with no derogations and a transition period of 18 months.
- Preferred option: A full ban with use-specific time-limited derogations

Timeline

- 22 March ´23: Publication of proposal; 6-month public consultation
- Mar ´23 – Dec ´23: RAC opinion development & Mar ´23 - Mar ´24: SEAC opinion development
- Dec ´23 - Feb ´24: 60-day consultation on the draft Q4 ´25 - Q1 ´26: Publication in Official Journal
- ´26/´27: Restriction becomes effective

Takeaways

Some PFAS compounds are already now regulated in the EU (POP, REACH, CLP)

Universal PFAS restriction is proposed

Assess the impact of the proposal and comment on the proposal – public consultation opened on 22 March until 25th September

- Especially on planned derogations - no information, no derogation!
- Submit objective data (scientific and socio-economic)
- Submitted data during the calls for evidence in 2020 and 2021 needs to be re-submitted

ECHA has written a short document specifically related to providing information on the PFAS restriction public consultation

Find alternatives and/or change processes (also nonchemical)

China New Pollutants Management

(Containing PFAS Control)

China's Control on New Pollutants

- **New** pollutants: persistent organic pollutants, endocrine-disrupting chemicals, and antibiotics, designated by the Ministry of Ecology and Environment
- Why "**new**"? : substances with hazards newly discoverd or paid attention to, not effectively governed by existing measures.
- *Action Plan for Control of New Pollutants* (关于印发新污染物治理行动方案的通知) proposed in Oct. 2021 and finalized in May 2022
  - A high-level directory plan on control of PFAS substances
  - Working direction: Issue the List of Key New Pollutants for Control (重点管控新污染物清单) and impose restrictions, bans, and emission control measures on these substances to minimize environmental risks.
- *List of Key New Pollutants for Control (2023 Version)* (重点管控新污染物清单（2023年版）) proposed in Sep. 2022, finalized in Dec. 2022, entered into force on 1 March 2023.
  - Regulates the whole category of PFOS, PFOA, PFHxS chemicals with systematic measures
  - Subjected to future updates.

Bans on Manufacture, Process, and Use

By List of Key New Pollutants for Control, effective on 1 March 2023.

Substance Category	Manufacture Ban (all purposes)	Manufacture Ban (with exempted purposes)	Process & Use Ban (All purposes)	Process & Use Ban (with exempted purposes)	Exempted Purposes (with exemption deadline)
PFOS	√			√	extinguishing foam agent
PFOA		√		√	semiconductor, roll film paints, PTFE, PVDF, FEP, etc.
Decabromodiphenyl oxide		√		√	antiflaming textiles, plastic additives, electronic parts, PU, etc.
Chloroalkanes C10-13		√		√	rubber, leather, lubricants, paints, adhesives, plasticizer, etc.
Hexachlorobutadiene	√		√		all banned, no exemptions
Pentachlorophenol	√		√		all banned, no exemptions
Dicofol	√		√		all banned, no exemptions
PFHxS	√		√		all banned, no exemptions
Other POPs	***Insight for Chemicals ***				

Other Controlling Measures on New Pollutants (including PFAS)

Stipulated By List of Key New Pollutants for Control, effective on 1 March 2023.

- Designate by local MEE.
- Carry out within two month.

- Apply and obtain passing letter.
- Checked by Custom.

Inventory of Toxic Chemicals Under Strict Restrictions (2020)

- Hazardous waste control plan, record-keeping, declaration.
- Store, reuse, and dispose - relevant standards.

National Catalogue of Hazardous Waste

- Desiganted by local MEE.
- Pollution identification and spread prevention.

- GB 31571 (petrochemistry)
- GB 31572 (synthetic resin)
- GB 21904 (chemical pharmaceuticals)
- GB 21903 (fermentation pharmaceuticals)

- GB 38508 (detergent VOC)

PFOA

- Ban the building of perfluorooctanoic acid manufacturing facilities
- Ban the manufacturing, processing, and use of PFOA except for certain purposes (specified in the List with no exemption deadline), companies that use PFOA for these purposes are under mandatory inspection of clean production
- Subject to the import (export) environmental management passing letter of toxic chemicals (有毒化学品进（出）口环境管理放行通知单) during import or export
- Subject to hazardous waste management (for those in *National Catalogue of Hazardous Waste* 国家危险废物名录)
- Subject to soil pollution management

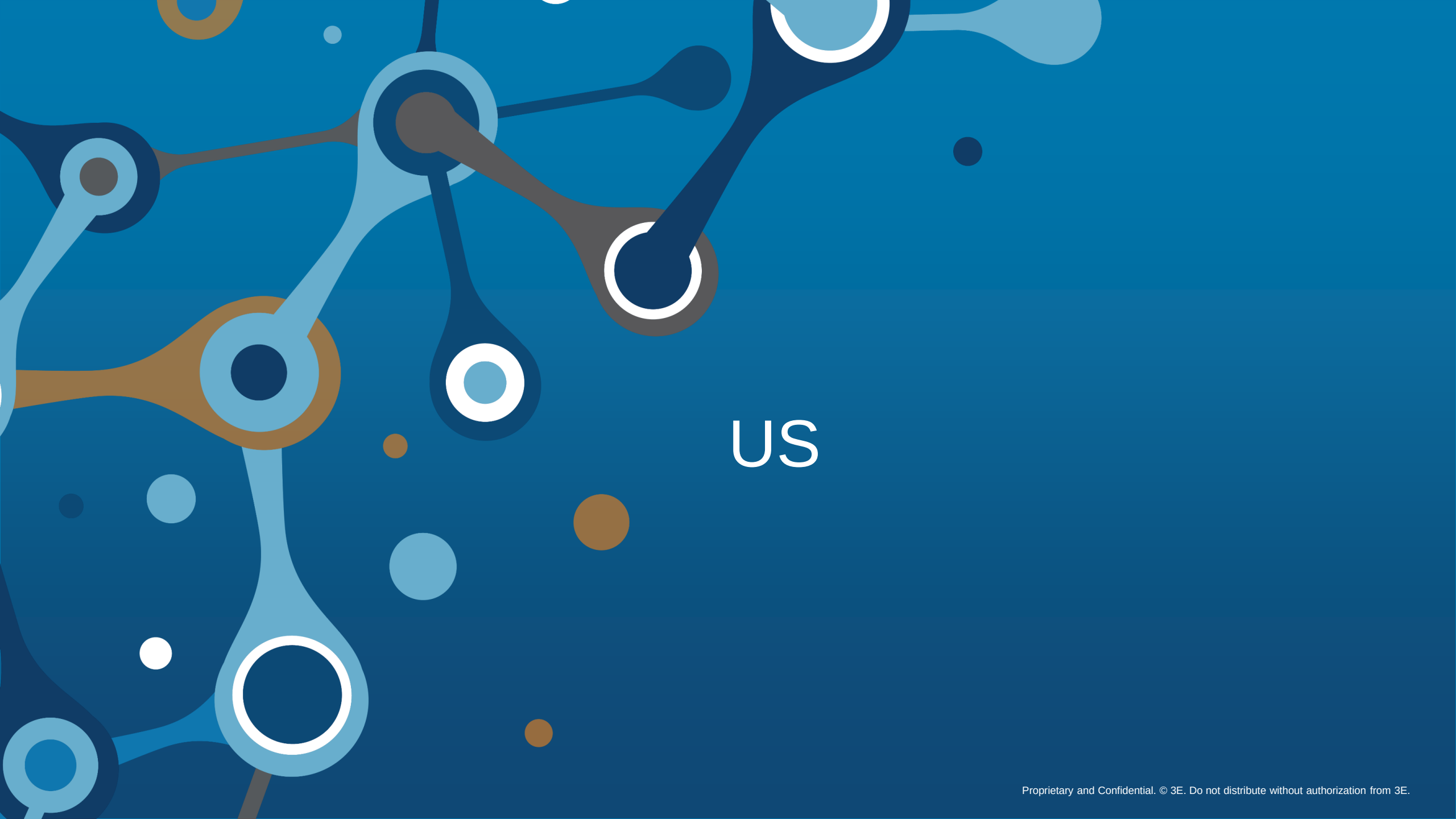
PFHxS

- Band the manufacture, processing and use, import and export (without exempted purposes)
- Subject to hazardous waste management (for those in *National Catalogue of Hazardous Waste* 国家危险废物名录)

Takeaways

PFAS in China

- Check supply chain, manufacture, process, use, and discharge activities:
  - Inventory of Toxic Chemicals Under Strict Restrictions (2020)
  - National Catalogue of Hazardous Waste
  - List of Key New Pollutants for Control (2023 Version)
- Note bans effective date and exemption deadlines (no longer exempted from bans)
  - PFOS: **1 March 2023**, ban manufacture
  - PFOS firefighting foam: banned beginning **31 Dec. 2023**
  - PFOS import & export: banned beginning **1 Jan. 2024**
  - PFHxS: Beginning **1 March 2023,** ban manufacture, processing, and use
  - PFOA: Beginning **1 March 2023,** ban manufacture, processing, and use. Some exempted.



U. S. EPA PFAS Roadmap (2021-24)

Research

Final

- National PFAS testing strategy - Test Order
- TRI Reporting for PFAS
- Monitor PFAS in Drinking Water
- Finalize Toxicity Assessments

Proposed

- PFAS Use and Exposure Reporting

Planned

- Develop improved analytical methods
- Monitor PFAS in fish
- Finalize biosolids risk assessment
- Identify, monitor PFAS in air emissions

Restrict

- PFAS SNURs
- Remove PFAS from FIFRA Inerts
- Designate 4 PFAS as hazardous waste
- Technology based effluent limitation guidelines
- Use NPDES Permits to reduce and monitor PFAS discharge

Remediate

- Drinking Water Health Advisories
- Proposed Hazardous Substance Designation for PFOA and PFOS
- Drinking water standards for PFOA and PFOS
- Establish ambient water quality criteria
- Proposed Hazardous Substance Designation for other PFAS
- Issue guidance for PFAS destruction and disposal

U.S. State Regulatory Actions

Hundreds of recent laws either passed or in discussion

Common themes in state regulations

- “PFAS” fluorinated organic chemicals containing at least one fully fluorinated carbon atom.
- Intentionally added PFAS including breakdown products of PFAS, but some also set limits on PFAS impurities
- Restriction of PFAS in firefighting foams, food packaging, children’s products, cosmetics, carpets, textile finishes, furniture, cookware
- Some phase outs will require product certificate of compliance.
- Down-hole oil and gas products.
- Maximum Contaminant Levels set for select PFAS in drinking water

Maine Products Containing Perfluoroalkyl and Polyfluoroalkyl Substances

Product Phase out

- 1 Jan 23, carpets, rugs and fabric treatments containing intentionally added PFAS
- 1 Jan 30, all products containing intentionally added PFAS
- Exemptions for products which are essential for health, safety or the functioning of society such as products used for climate mitigation, critical infrastructure, delivery of medicine, lifesaving equipment, public transport, and construction.

Reporting Requirements

- Product Description (GPC Brick, HTS.Stock No. or product code, type of product, use)
- Purpose of PFAS in the product
- Name, CAS RN, conc. or exact amount of PFAS (concentration or amt. must be determined by commercially available analytical methods)
- Reported information may be claimed confidential
- Name and address of company and name, address, phone and email of company official
- Notification Fee of $250 for the first three notifications and $50 for each additional notification. No fees are required for updated notifications.

Safer Products for Washington

Phase 1

Priority Chemicals

- Perfluoroalkyl and polyfluoroalkyl substances and others listed

Phase 2

Priority Consumer Products

- Identify products containing PFAS

Phase 3

Regulatory Determinations Report to Legislature

Phase 4

Proposed Rule

- 1 June 2023 - Rulemaking deadline
- 1 Jan 25 - Ban Aftermarket stain- and water-resistance treatments, Carpets and rugs, Leather and textile furniture and furnishings (indoor)
- 1 Jan 24 - require reporting of leather and textile furniture and furnishings (outdoor)
- Exemptions for replacement parts, recycling or disposal of products
- Request for further exemptions: no PFAS substitute available, conflicting regulatory requirement

US: PFAS Takeaways

- The definition of PFAS is not consistent at the U.S. Federal or State level.
- Several agencies are actively involved in regulating PFAS using many different programs.
- Many U.S. States are prohibiting PFAS in a range of consumer and industrial product types.
- Identifying PFAS in your products and supply chain is critical
- Product testing and certificates of compliance may be required.

Wrap-Up

Managing risks is core to creating an organization that is not only compliant, but also sustainable and resilient

Companies are doubling down on managing these risks due to greater **supply chain complexity**, a faster **regulatory environment**, and **heightened awareness of these issues** from customers, employees, business partners, etc.

Contacting Suppliers

- Ensure you are asking PFAS questions with the right definitions.
- Design a questionnaire that asks for functions or roles of raw materials to give you more insights into whether the raw material contains the chemical or not.
- Allows suppliers to mark unknown.
- Proactively supplier education on why this is important.
- Request existing documentation – test reports, etc to ensure that the information was used.

Per- and polyfluoroalkyl substances, PFAS

How to use data help to navigate the PFAS challenge

PFAS Challenge is a Data Challenge

The number of individual PFAS substances is unknown, but we have close to ten thousand substances

PFAS information requests

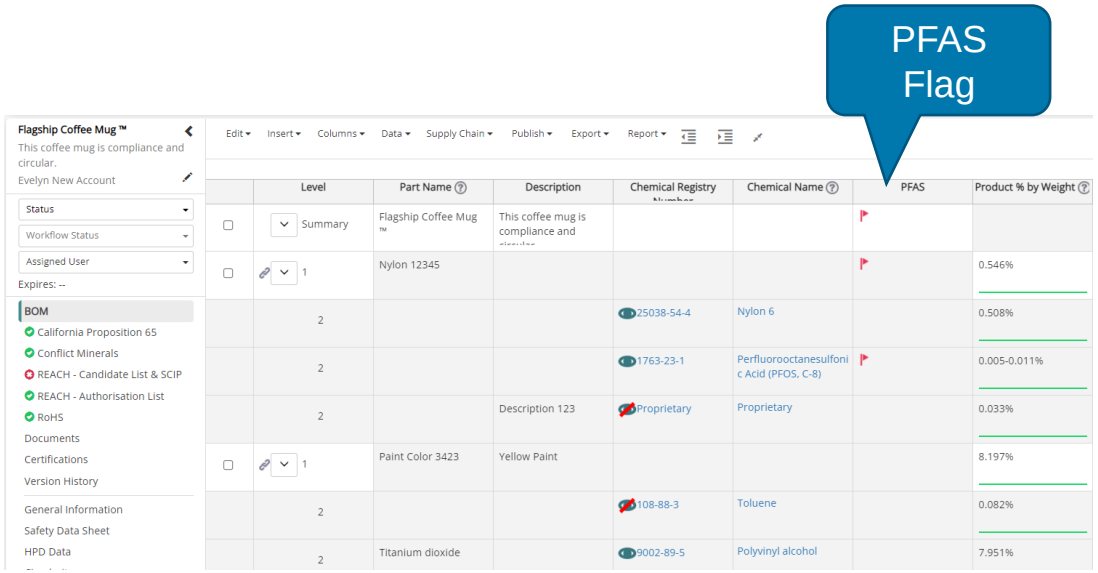
We help clients assess whether their products, processes, and facilities are impacted by current/proposed regulatory action on PFAS

Taking care of “PFAS”

Screening an individual product (entire catalog of products/materials possible) via CAS against the PFAS list

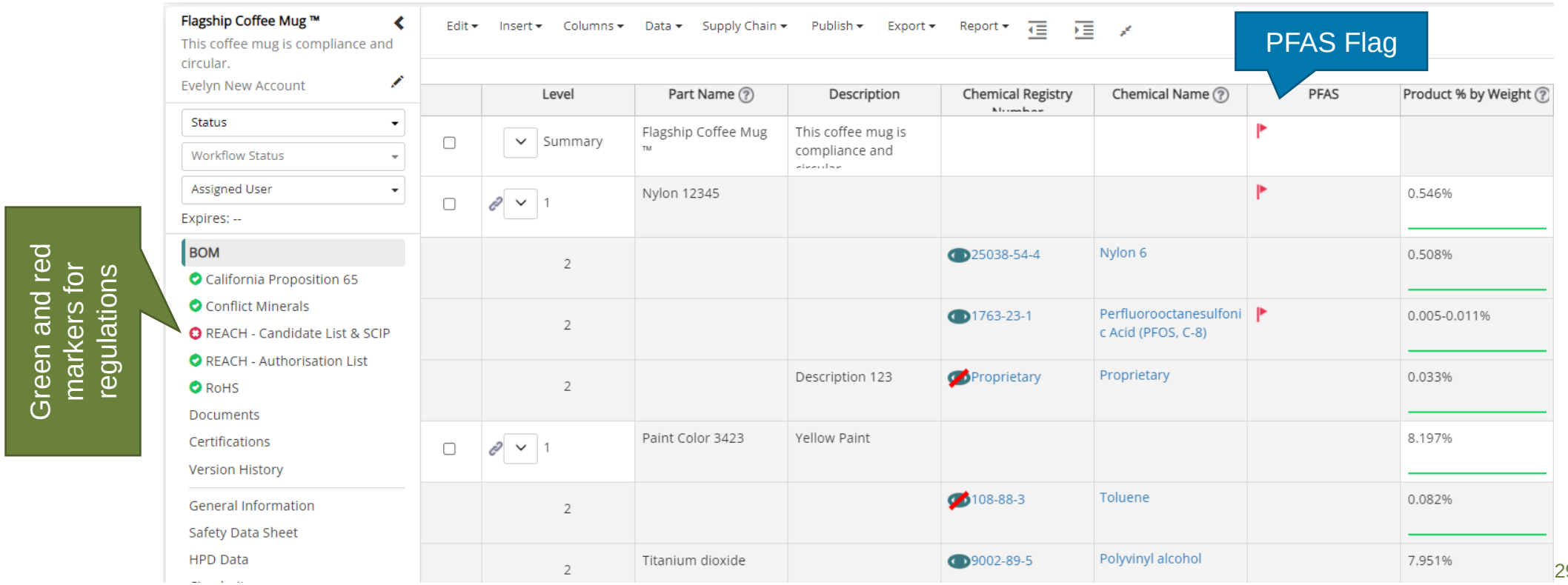
Have data ready to report

Information easy to process and submit to the notification body (e.g., Maine)



Screening Chemicals of Concern

- Example of screening an individual product (entire catalog of products/materials possible)
- Screening via CAS against the PFAS list
- Information easy to be processed and submit to the notification body (e.g. Maine)



Best Practices for Leveraging your Supply Chain & Analyzing Impact