PFAS

What are we seeing out there!

Dec 2025

ELEMENT IN ENVIRONMENTAL

AIR QUALITY

WATER QUALITY – FRESH AND SEA WATER

Tissue

SOILS AND SEDIMENTS

ENVIRONMENTAL COMPLIANCE

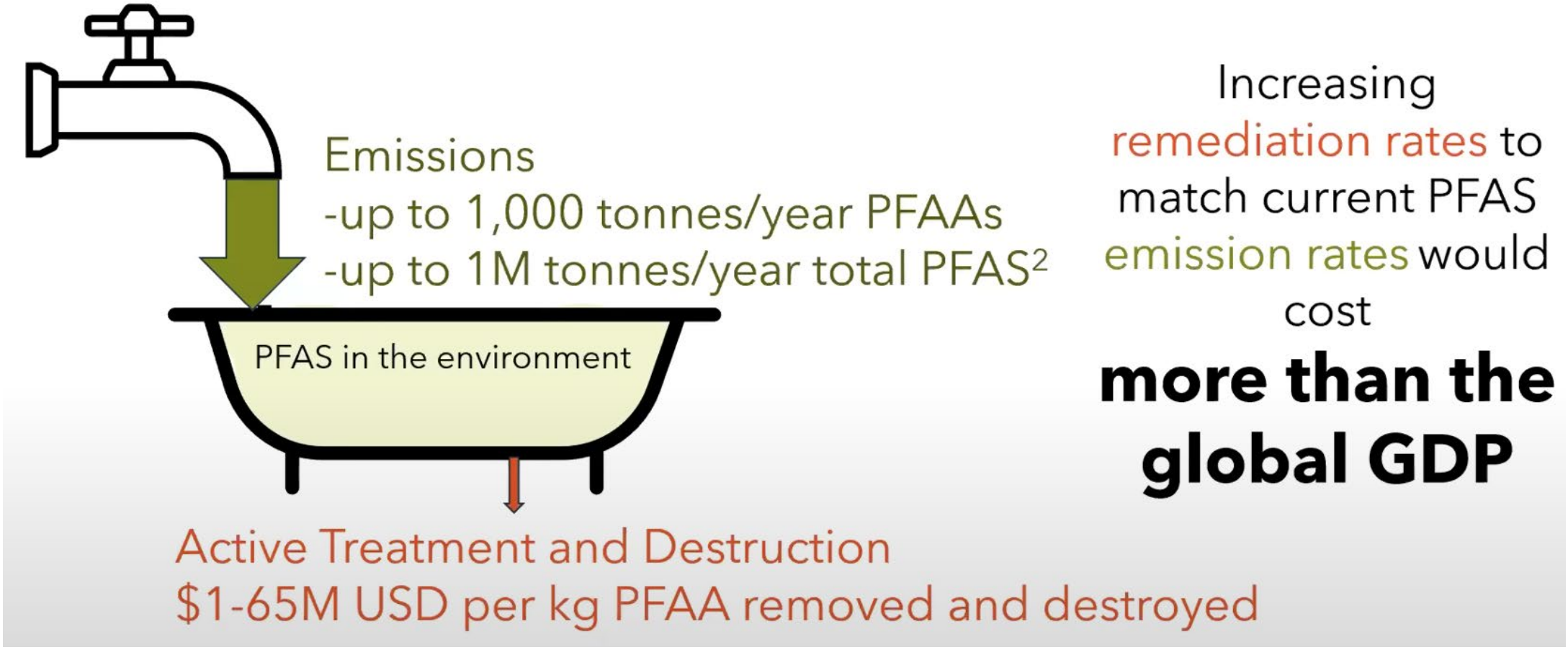
Making tomorrow safer than today!

Quick background

- Professional Chemist in BC
- Worked in a few labs = food, supplement, pharma, environmental
- Contract manufacturing supplements and pharmaceuticals
  - Sourced chemicals to fix issues and make runs more efficient
- Chemical ingredient distribution
  - Sold chemicals locally from Dupont, 3M, BASF etc and got to see how they work

Y.N.W.A

The issue of persistence



Treatment is not a feasible solution!

Bans opposed at every level by chemical companies

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Where do we find PFAS

- PFAS in consumer products = food, textiles, plastics, paper, diapers, cookware, paints, etc etc
- PFAS in manufacturing = chemicals, fertilizers, pharmaceuticals and medical devices, mining and refining, plastics and resins, coating
  - Many companies do not know they were using PFAS, "trademark" chemical mix
- **Concentrate in landfills and wastewater treatment plants**

Which of these is a major source?

- Michigan study found **domestic use not a significant source** of PFAS contamination

- Major sources were:
  - Industry – metal plating and finishing, petroleum refineries etc
  - AFFF sites
  - Landfills and WWTPs

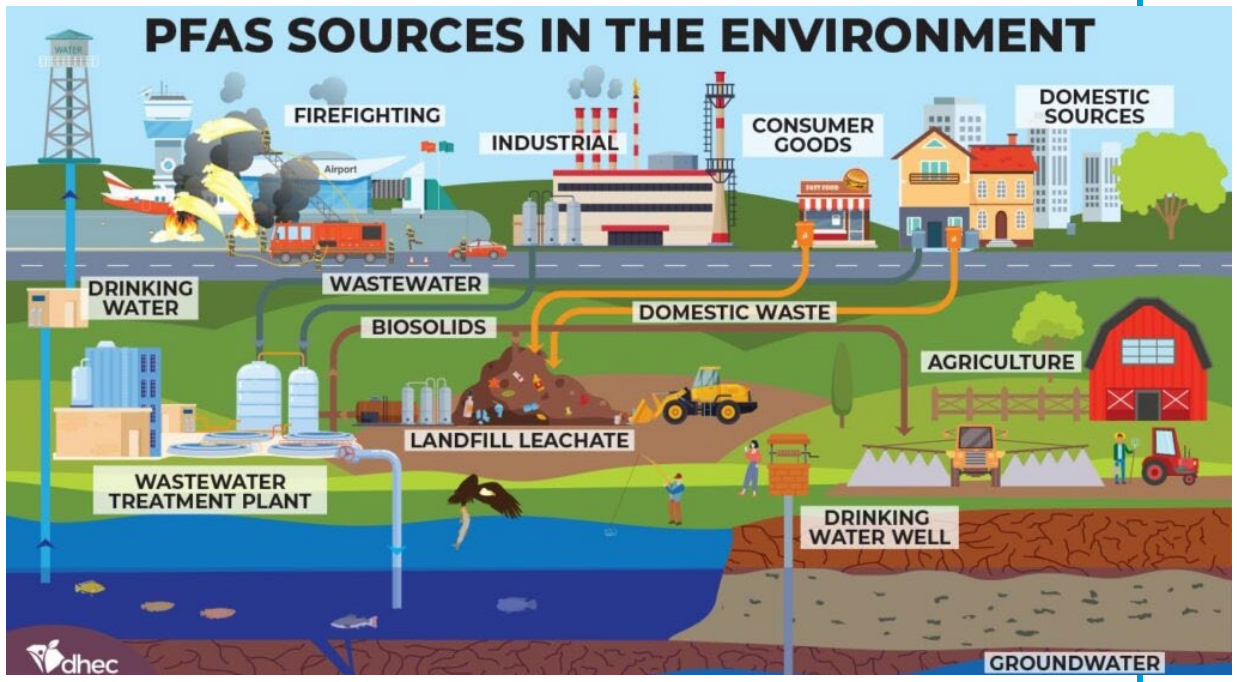
- **Concentrate in landfills and wastewater treatment plants**

Landfills and WWTP Key passive receivers

- Treatment of waste being received is not feasible (too expensive)

- Regulation of sources of PFAS coming into sites is very possible
  - Set a limit for PFAS in WWTP stream
  - If above limit source of PFAS determined
  - Fines to source and requirement to stop

Upstream evaluation is key to limit PFAS at these sites – stop or slow it at source



UPSTREAM EVALUATION

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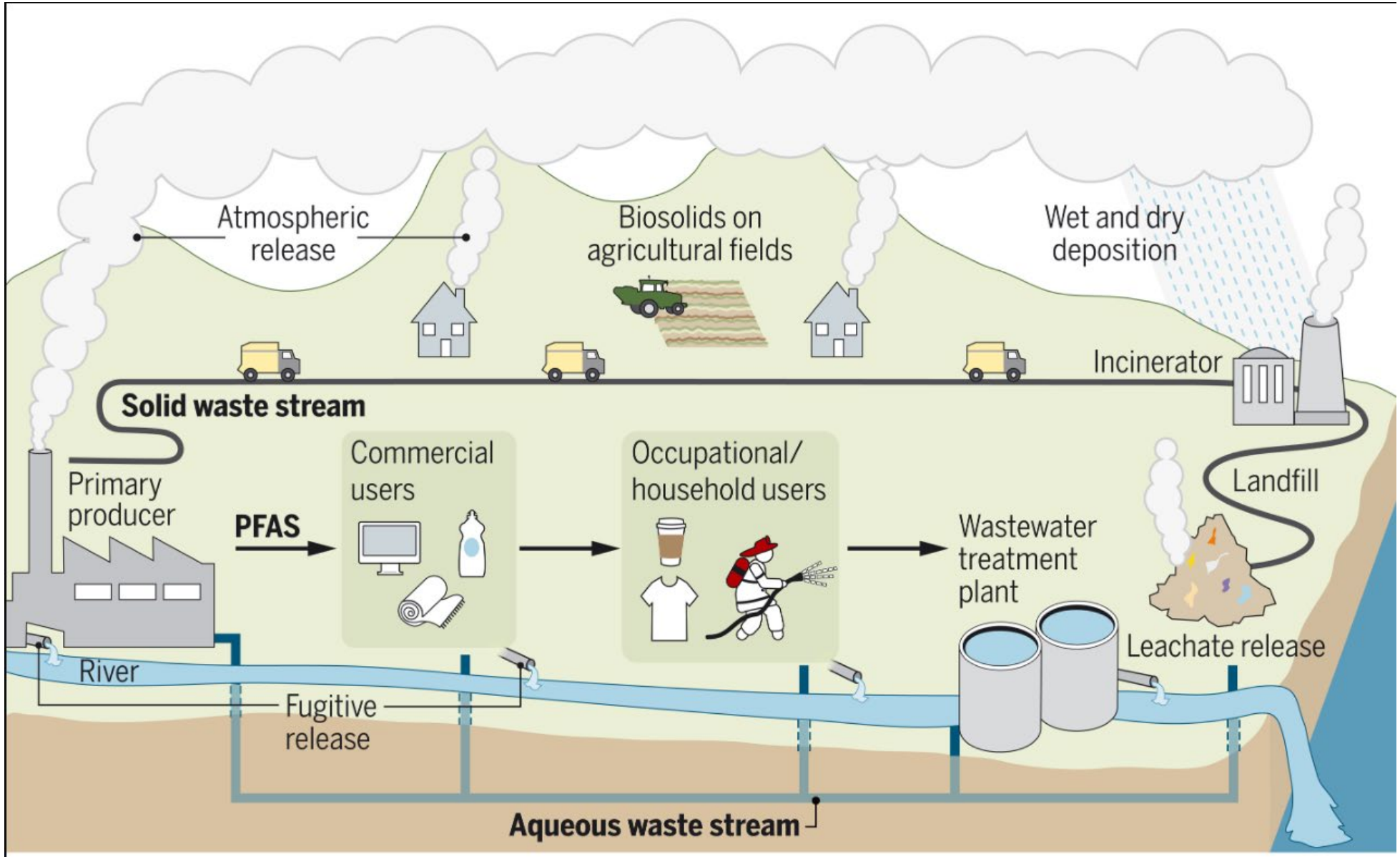


Primarily using EPA 1633, sometimes with a handful of additional compounds

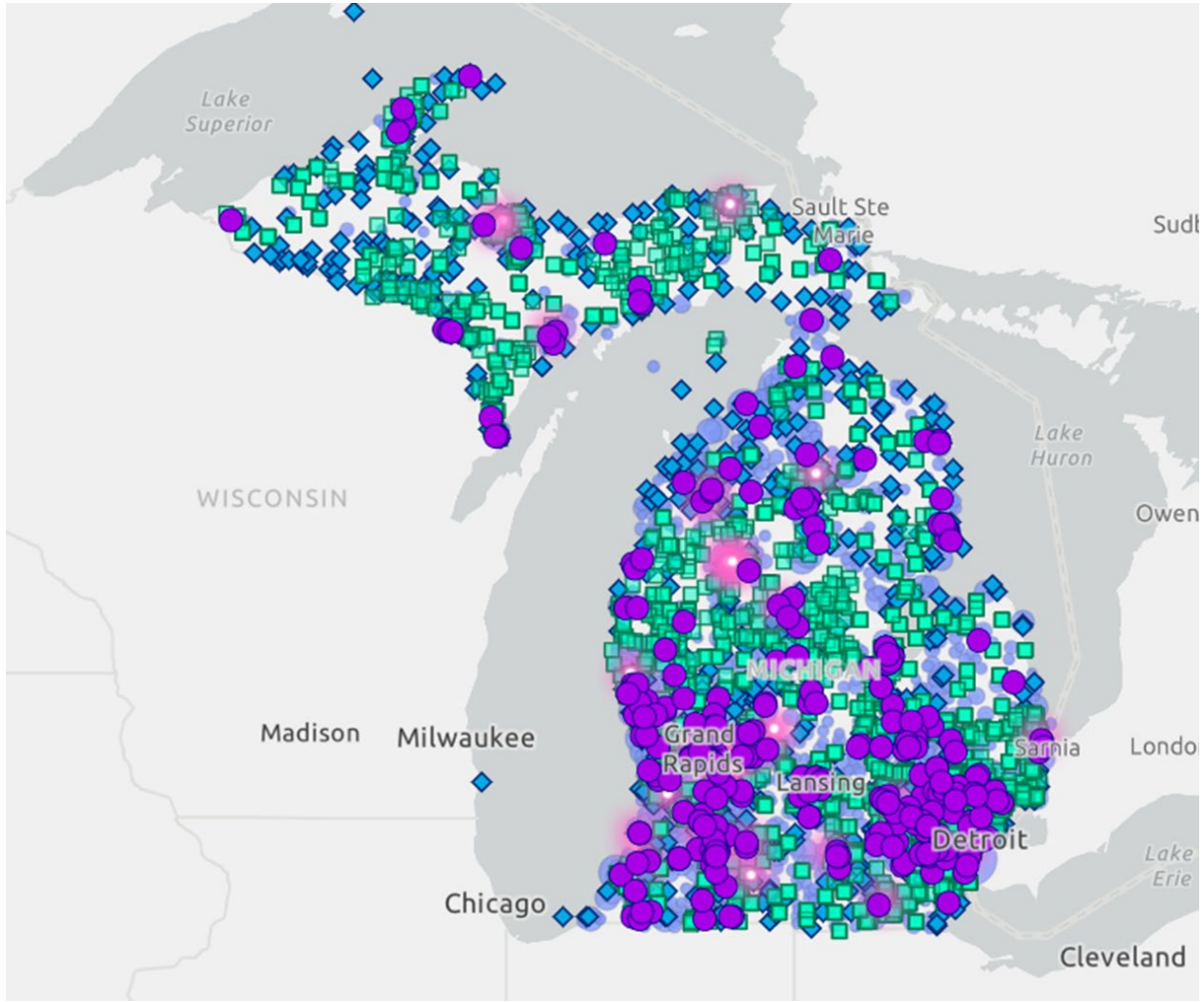
This works!

Industry facing fines

Treatment? Too expensive!

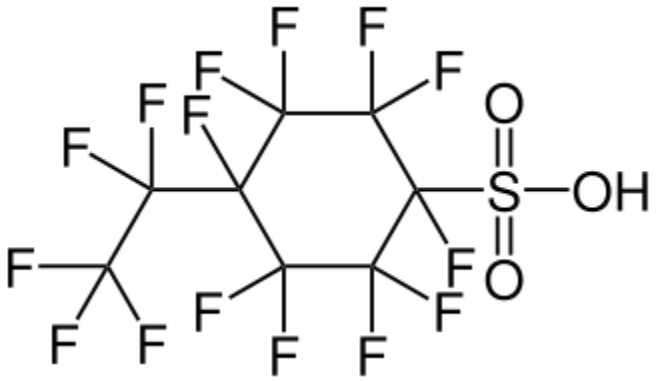
Get alternatives

Economic driver for chemical companies to make those!



PFAS in metal plating and finishing

- PFAS regularly used in metal plating and finishing baths to suppress mists – surfactants
- Major industry with a range of small and medium sized facilities serving the automotive, aerospace and parts industries
- PFOS, PFOAused initially, but those have phased out
- These have been found in numerous states and traced back to discharge from these facilities
- Not part of any discharge permits, and not monitored
- Not all compounds part of screens
- Persistent even when stop usage



PFAS in Pulp and Paper

- Coating to prevent water and grease from sticking. ~40% of food contact paper contains PFAS
- Several sites in BC produce or produced food contact paper, or used PFAS as part of their processes as well

Application	Type of Paper	PFAS Used
Food wrappers	Burger wrappers, deli papers	FTOHs, diPAPs
Microwave popcorn bags	Grease-resistant paper	PFOS (historically), 6:2 diPAP (now)
Baking paper	Parchment, liners	FTOHs, fluorinated polymers
Take-out containers	Boxboard, molded fiber	PFAS surface coatings
Fast food cups	Liquid-resistant paperboard	PFAS-based barriers

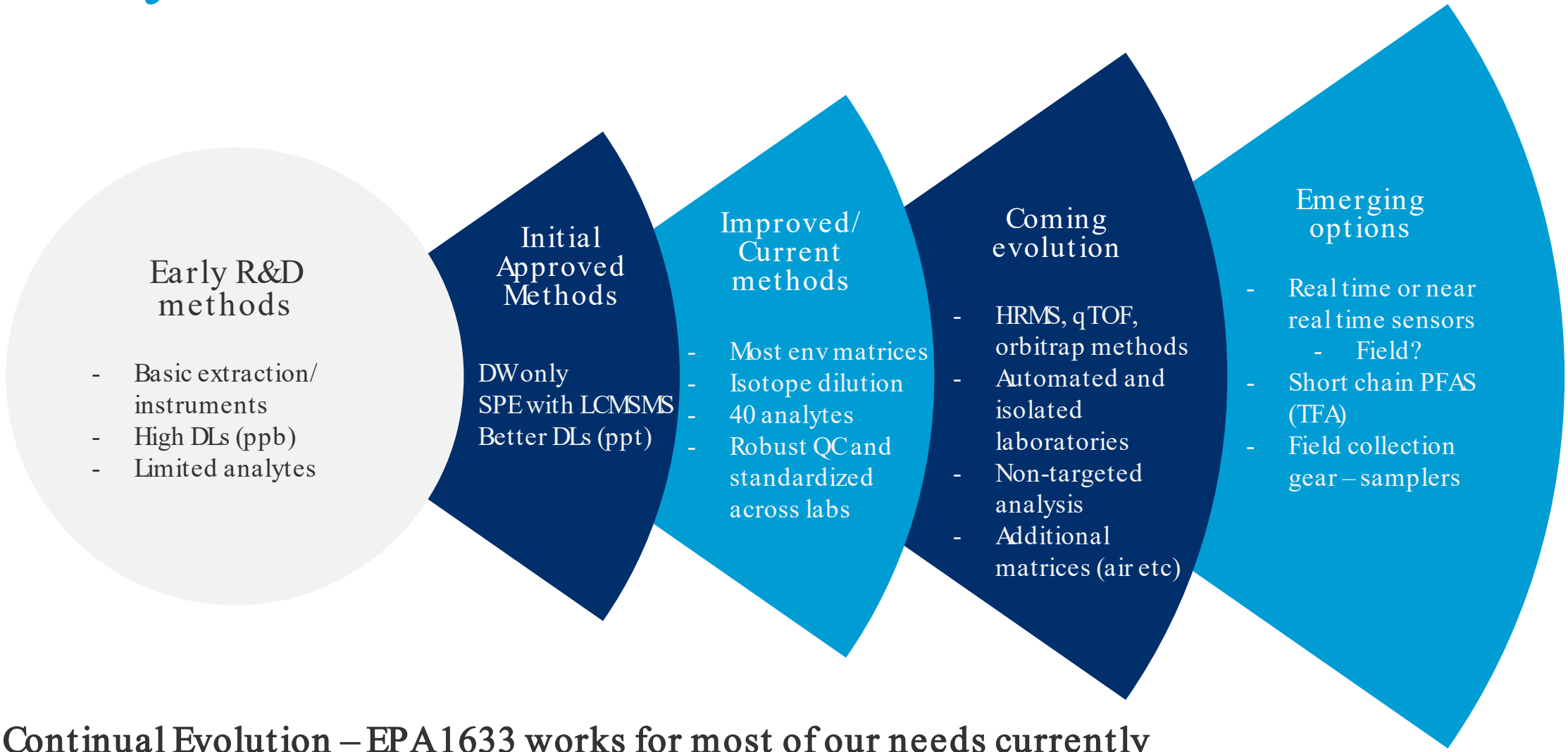
PFAS in oil and gas industry
Extraction

- Drilling and production chemicals
  - Surfactants create foams to minimize fluid loss, and act as anti-foaming agents for water-oil separation
- Stimulation Chemicals
  - Stable, low surface tension wetting agents to promote displacement and recovery
- Tracers
  - Mapping and movement
- Storage and Containment
  - Prevent evaporation and contain spills on water, PTFE, PFA, PVDF etc

PFAS in oil and gas industry
Safety

- The most effective control for hydrocarbon fires are still PFAS containing AFFF systems
- Louisiana and facilities on the Gulf are starting to replace
- Military bases, firehalls and airports have gone through phaseouts – Lessons learned:
  - PFAS residue persists within system
  - Historic fires or tests likely created contaminated sites

Where are we going
Analytical Evolution



Continual Evolution – EPA 1633 works for most of our needs currently

Practical solutions

1. Restrict PFAS **USAGE**
   - THIS WORKS!!! PFOAand PFOS going down!

2. Regulate from sites where **PFAS concentrate**
   - Landfills and WWTP → Upstream evaluation
   - Industry treat or remove
   - Testing with 1633 works in most cases!

3. Targeted **treatment**
   - Where it is most effective

THANK YOU

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