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MANAGING POWER INDUSTRY OPERATIONAL AND ENVIRONMENTAL RISKS RELATED TO PFAS

USWAG | PFAS Workshop | May 2025

- Introduction
- PFAS in Supply Chains
- PFAS in Water and Wastewater
- Management of PFAS Releases
- Conclusions

CONNECT WITH US

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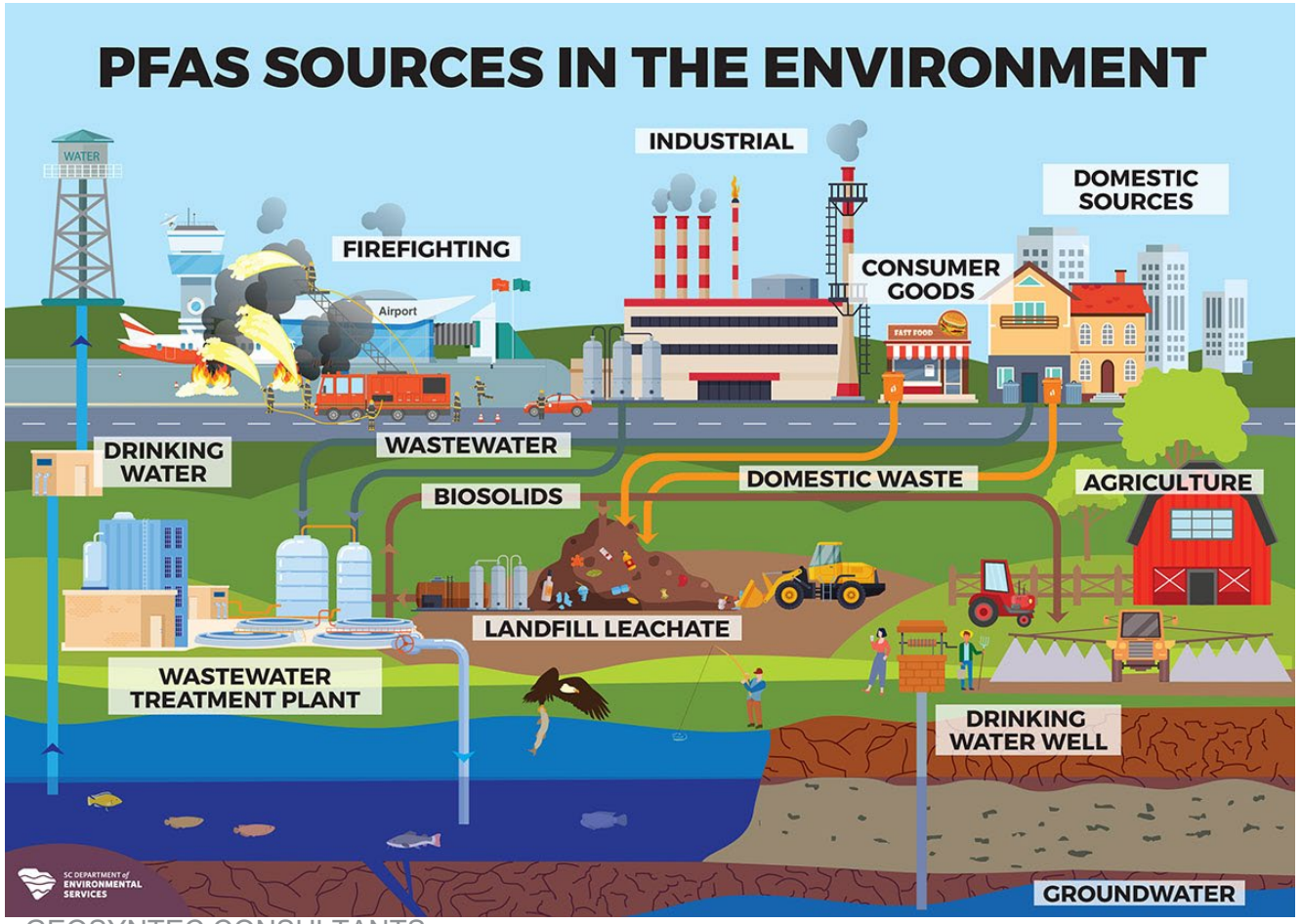
PFAS IN SUPPLY CHAINS

PFAS CONSIDERATIONS



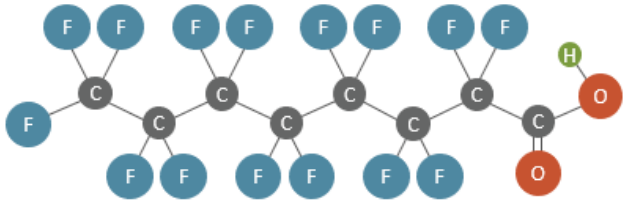
A class of thousands of man-made "forever" chemicals used since the 1940s

Various applications – firefighting foam, industrial applications, industrial and consumer products

Highly soluble and persistent in the environment – found in water, soil, air, and sediment, and bioaccumulate in animals and plants

Health effects include risk of cancer, reproductive, endocrine, and immune system impacts, liver disease, vaccine resistance at low concentrations

Difficult and expensive to treat and clean up



PFAS SOURCES

Aqueous film forming foams (AFFF)
Aerospace
Alternative energy
Automotive
Building and construction – weather resistant coatings
Biosolids
Chemical manufacturing
Cosmetics, bug spray, sunscreen
Electronics
Heavy industry (Chrome Plating)
Fire fighting/training facilities
First responders
Healthcare
Industrial surfactants
Landfills – leachate, odor and dust control
Leather
Medical – implants, patches and grafts
Metal plating and etching
Mining – odor and dust control, enhanced recovery, biosolids for reclamation
Military
Oil and gas – enhanced recovery
Paints, varnishes, sealants, waxes and polishes
Paper products – food packaging
Personal care products
Performance chemicals – hydraulic fluids, fuels
Pharmaceuticals
Photolithography
Plastics & Polymer manufacturing
Resins
Semiconductors
Stain repellants
Textiles and carpets
Wastewater treatment plants
Weather-resistant apparel and equipment
Wire manufacturing and coating

“The only places we’re not finding PFAS are places we’re not looking”

Heather Greither, Director, Michigan Department of Environmental Quality

YOU CAN'T MANAGE WHAT YOU DON'T MEASURE

Evaluate processes and PFAS/AFFF usage drivers

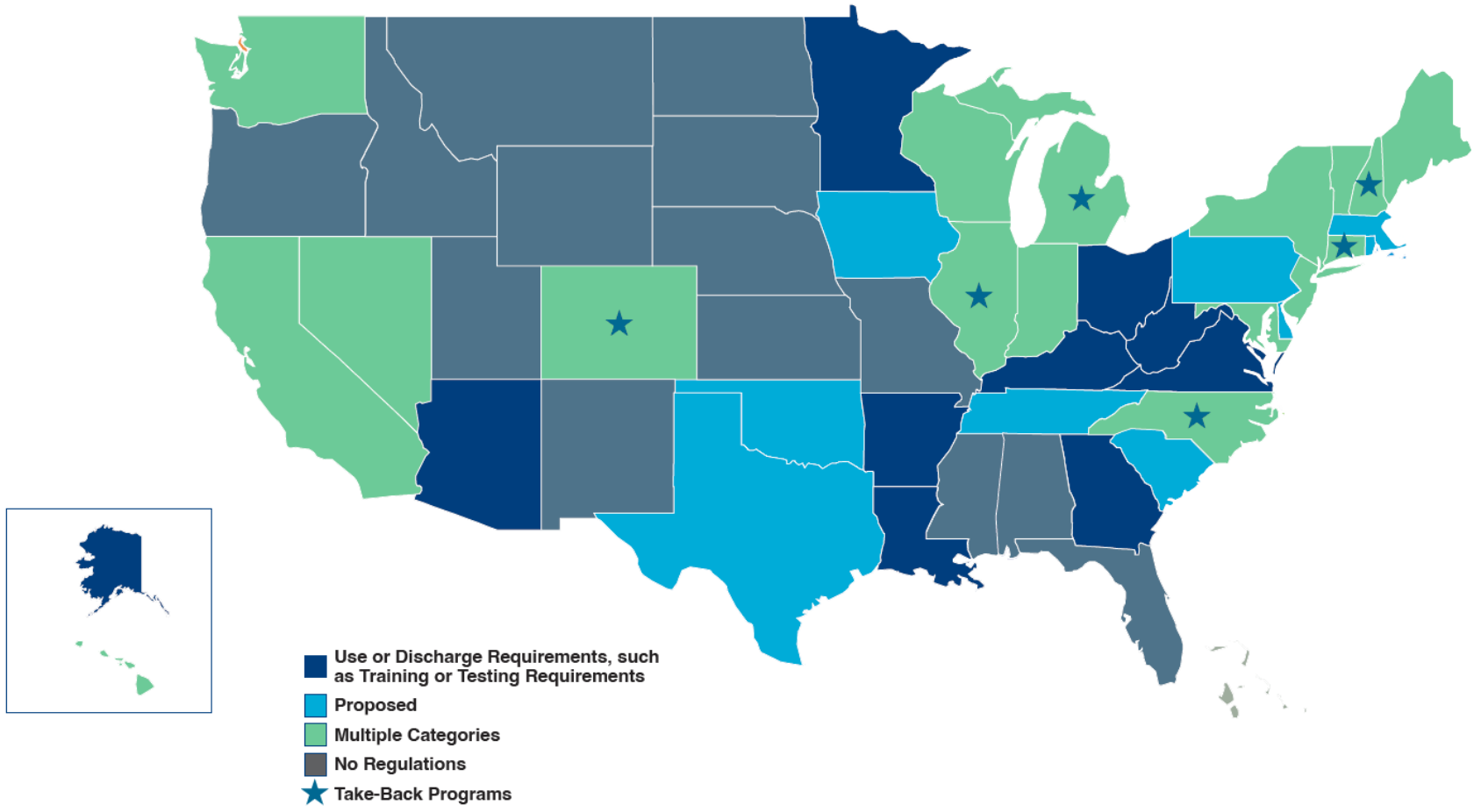
Evaluate storage, usage and cleanup standards

Evaluate waste streams and disposal endpoints

Evaluate site setting and potentially impacted media and infrastructure




STATE-SPECIFIC AFFF REGULATIONS



PFAS IN PRODUCTS

TSCA Section 8(a)(7) PFAS Reporting Rule (US)

EPCRA – Tier II and TRI Reporting

State-Level Authority

CEPA PFAS Reporting Notice (Canada) – Paragraph 71(1)b

Common potential PFAS presence at facilities

- Operating equipment, vehicles, chemicals, pumps, valves
- Fire fighting systems and foams, land application through contaminated biosolids
- Textile treatments
- Adhesives, lubricants, corrosion inhibitors and equipment components
  - Non-stick surfaces, electronics, valves, gaskets, O-rings, water filters

PFAS IN PRODUCTS

United States, Canada, and European Union regulatory drivers

State level regulation

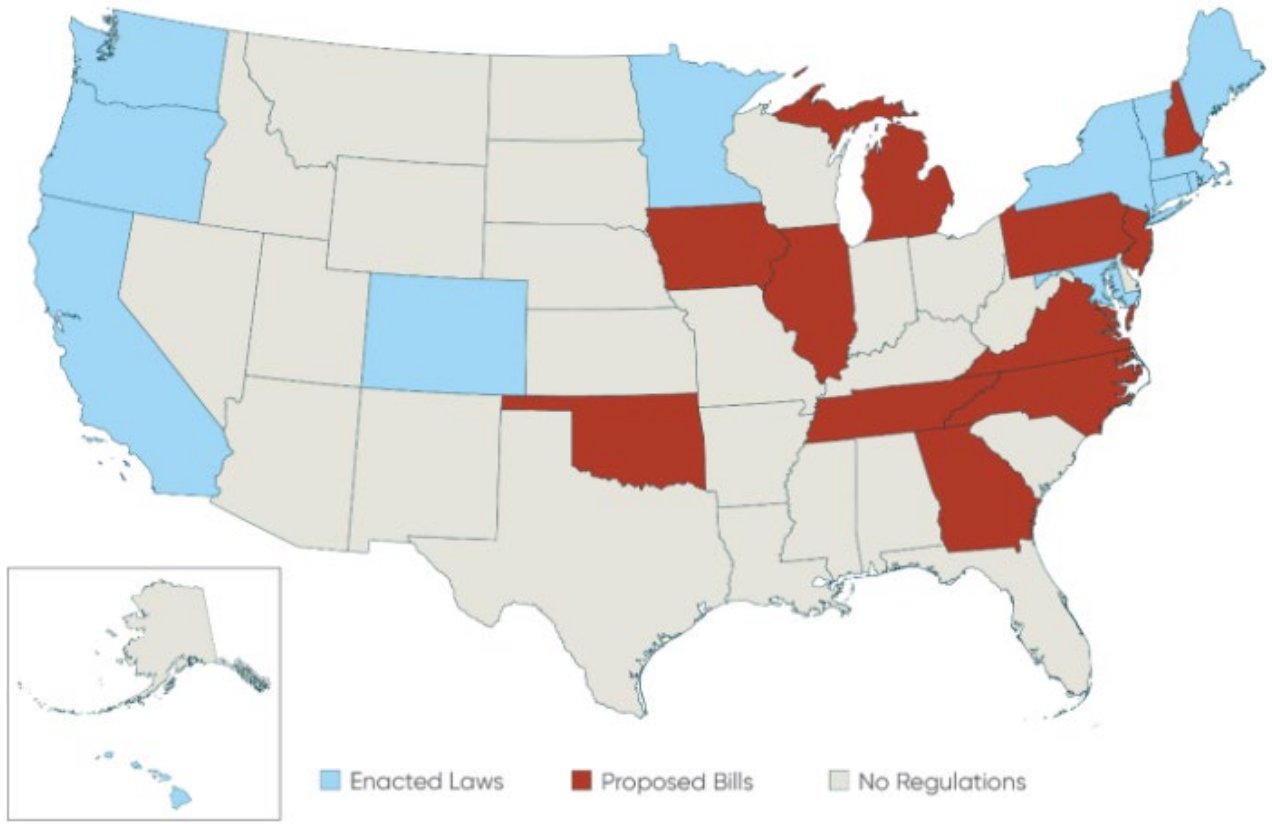
- Varied approaches
- Reporting/registration
- Limits/bans

Rapidly evolving area of regulation where requirements do not align among jurisdictions

- *Tracking and screening are critical*

Manage risk through product knowledge and supply chain engagement

ENACTED/PROPOSED CONSUMER PRODUCT LAWS



As of November 7, 2023

- Definitions vary – Intentionally added PFAS/No PFAS
- Sectors:
  - Food Packaging
  - Carpets, Upholstered Furniture, Textiles, Apparel, Footwear
  - Juvenile products
  - Personal Care Products, Cosmetics
  - Cookware

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PFAS IN WATER AND WASTEWATER

DISCHARGE PERMIT REQUIREMENTS

EPA Guidance on PFAS BMPs for Pollution Prevention and Source Reduction

- Product elimination or substitution
- Minimize accidental discharge by optimizing operations and good housekeeping practices
- Decontamination or replacement of equipment

Analytical methods

- 1621 - Screening method for total fluorine
- 1633 – Method for non-potable water and other media

Potential for air permitting requirements

- OTM-45 – 50 PFAS compounds for emissions from stationary sources

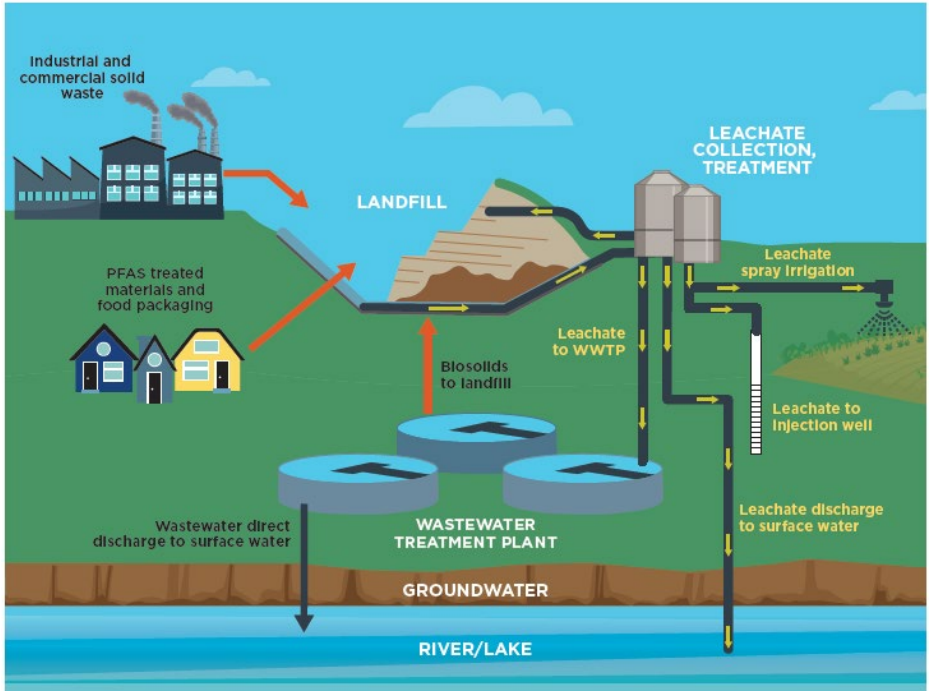
npdes_pfas-memo.pdf (epa.gov)

STATE-SPECIFIC CONSIDERATIONS RELEVANT TO POWER INDUSTRY

- NPDES permits that discharge to potential drinking water sources will include PFAS monitoring
  - GA will require PFAS monitoring for dischargers
    - A number of power utility sites are on the August 2024 *draft* list
  - NC has technology-based effluent limits (TBELs) for PFAS
  - MN has water quality-based effluent limits (WQBELs) for PFOS
- Land application of treatment residuals outlawed in Maine
  - Six states require testing of biosolids for PFAS

ELG DEVELOPMENTS (PRELIMINARY PLAN 16)

- Steam Electric Power Generating ELGs (40 CFR Part) 423 finalized on May 9, 2024
  - PFAS are not part of the ELGs
- Ongoing ELG Rulemaking related to PFAS
  - Organic Chemicals, Plastics, and Synthetic Fibers (PFAS Manufacturers) (40 CFR Part 414)
    - Proposed rule by fall 2024
  - Metal Finishing (40 CFR Part 433) and Electroplating (40 CFR Part 413)
    - Proposed rule by spring 2026
  - Landfills (40 CFR Part 445)
    - Proposed revised ELGs in 2027



ELG DEVELOPMENTS (CONT.)

- Ongoing Effluent Guidelines Studies related to PFAS
  - Airports
  - Pulp, Paper, and Paperboard
  - Textile Mills
  - POTW Influent PFAS Study
  - PFAS Processors

Source of Image:
https://usadebusk.com/applications/pulp-paper-plants/

PFAS EFFLUENT > INFLUENT?

- Intake water from major rivers may have detectable PFAS “background” concentrations
- Process water (e.g., for cooling purposes) may concentrate “background PFAS” through evaporative processes
- Discharged non-contact cooling water may contain higher PFAS concentrations than intake water
    - Additional study/sampling needed to evaluate

Source of Image: https://www.powermag.com/cooling-water-intake-structure-regulations/

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MANAGEMENT OF PFAS RELEASES

RISK ANALYSIS PROCESS

- Understand regulatory framework and potential future regulations
- Evaluate potential release pathways
- Consider external influences
- Evaluate cost of action and inaction
- Apply numerical risk assessment and make educated decisions
- Prioritize responses based on risk

ENVIRONMENTAL SAMPLING

Be Careful…

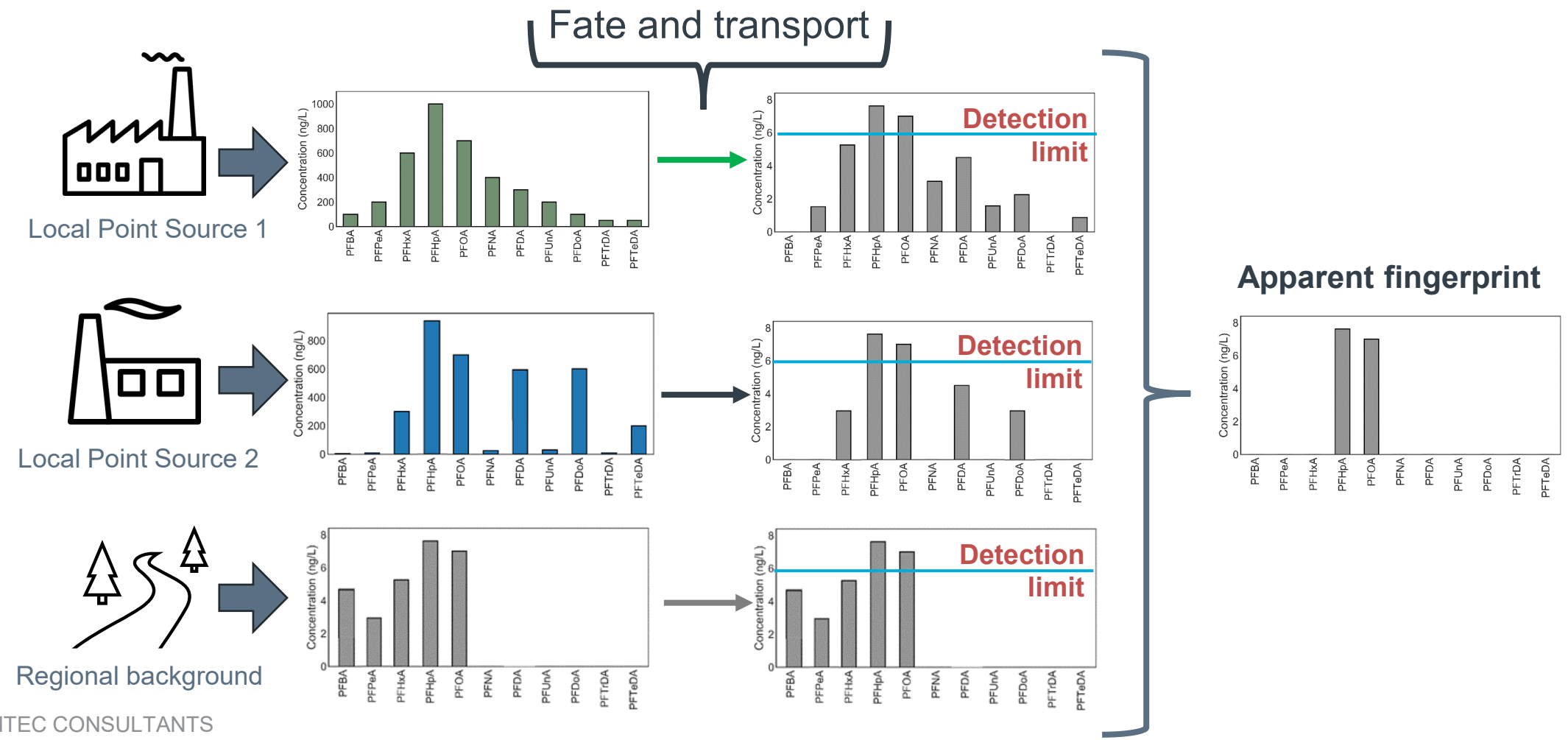
- Very low reporting limits magnify the importance of cross contamination
- Trace background PFAS can be detected
- Trace PFAS levels are detected in some drinking water systems
- Trace PFAS may be present in standard decontamination materials (e.g., distilled water)
- There are uncertainties on the patters of PFAS released from materials

But Don't Overreact…

- PFAS have a stable chemistry and are unlikely to be released under most conditions
- Many precautions don't have scientific data to prove the concerns
- PFOS & PFOA have been phased out of consumer goods
- With proper planning the risk of false positives can be significantly reduced
- There are other contaminants with similar low detection limits (e.g., dioxin; MCL = 30 ppq)

Modified from: Chiang et al., 2016

WHY SHOULD WE CONSIDER PFAS BACKGROUND?



CRITICAL SUCCESS

- Clearly define and communicate goals and desired outcomes
- Avoid predetermining critical path items
- Engage necessary staff and departments
- Leverage local operations expertise
- Be open to an iterative process

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CONCLUSIONS

CONCLUSIONS

- While power utilities are not known PFAS "sources," they likely have multiple PFAS-containing products
  - Historical fire-fighting operations
  - Coatings, hydraulic fluids, grease, wastewater residuals, etc.
- Background PFAS in intake water can be concentrated in effluent through evaporative processes
- Evaluate potential sources and liabilities based on historical records

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