DIFFERENTIATION OF PFAS SOURCES USING CHEMICAL FORENSICS

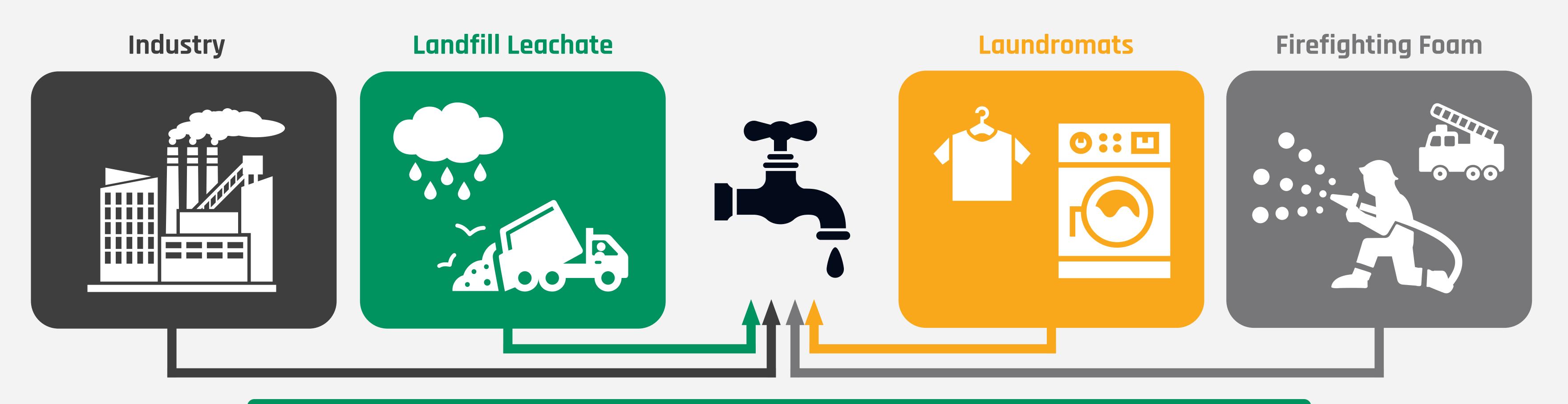


ABSTRACT

The detection of PFAS in soil, groundwater, and other environmental samples is not uncommon and may present complex legal entanglements for business and industry. The pervasive occurrence of PFAS in the environment and their ability to be detected at part-per-trillion levels makes it possible to find PFAS compounds where they may be least expected. Moreover, identifying the source of PFAS in the environment and assigning appropriate liability becomes problematic when several potential sources of the PFAS may exist. Forensic analytical techniques help distinguish between likely PFAS source(s). A sound conceptual site model approach using chemical forensics, and an understanding of historical PFAS use and chemical transformation processes in the environment provide strong clues as to the likely source(s) of PFAS detected in the environment.

1-SOURCES OF PFAS

Industry, landfills, car washes and firefighting foams are a few of several potential sources of PFAS in the Environment.



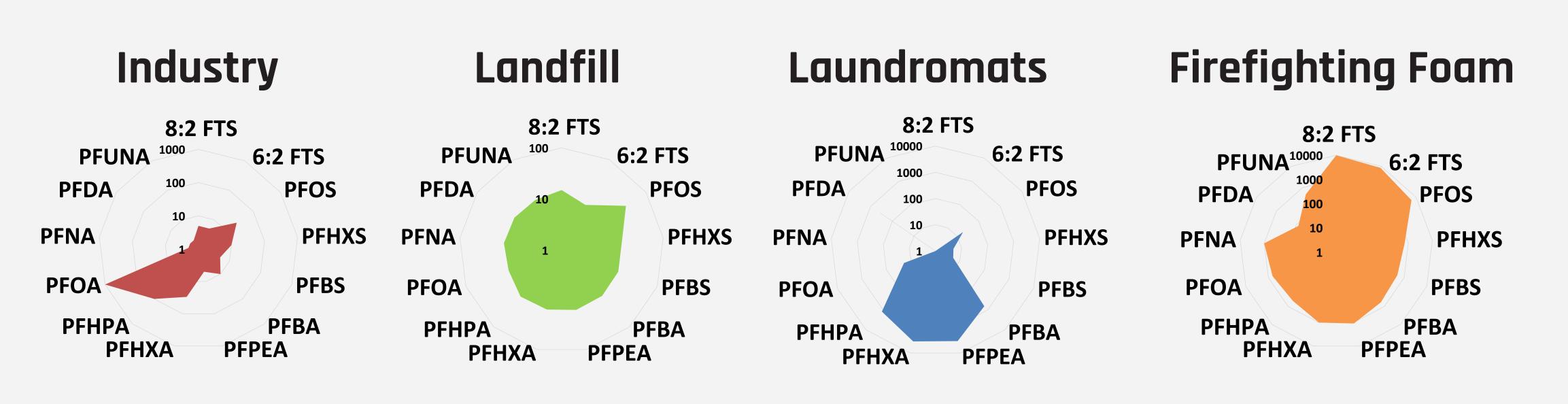
CONTAMINATED HOMEOWNER WELL, WHO'S THE RESPONSIBLE PARTY?

2 - PFAS RELATIVE RATIOS

- Relative ratios can be used to distinguish sources or evaluate commingling plumes
- Fire fighting foams were primarily composed of PFOS and later fluorotelomers (8:2 FTS and 6:2 FTS)
- Landfills that received material from multiple sources like carpet, Teflon coated products, waterproof cloths, wax coated food packaging would be expected to have an even distribution of PFAS compounds

3 - PFAS FORENSICS

- Sources often have unique signatures due to the relative ratio of PFAS as indicated by the associated radar charts
- Radar charts show the relative concentrations of multiple PFAS compounds at a site, with a concentration of 0 in the center and a maximum concentration on the outer circumference.
- The shaded regions point to detected compounds, and the more prominent the shaded point, the larger the concentration of that compound. Example: PFOA was very prominent in industry whereas PFUNA was used infrequently.



4 - CASE STUDY EXAMPLE

- The example homeowner well has strong correlations with PFAS contamination from landfills and industrial sources.
- Laboratory analysis using chemical forensics to identify PFAS ratios reveal that contamination detected in the homeowner's well water has strong correlations with PFAS concentrations from both landfill and industrial sources.

