AN ALTERNATE APPROACH TO SUPPORT PFAS RISK DECISION-MAKING

Per- and polyfluoroalkyl substances (PFAS) have created additional complexity in assessing risk in raw materials, finished products, and potable water. Unknowns associated with the complex toxicity, fate and transport, regulation, and risk decision-making related to PFAS create a foundation of unnecessarily conservative assumptions in the development of regulatory criteria. Typical methods to assign toxicity, such as extrapolation from one compound to another, additivity, toxicity equivalence factors, and relative potency factors, may be poor estimators of actual risk attributable to the presence of PFAS. The assumption that toxicity or potency is proportional to carbon chain length of the PFAS may also overestimate actual risk.

Development of a relative risk model as an alternate approach to support risk decision-making, protective of human health and the environment from actual risk due to the presence of PFAS, is essential in site management and sound business decision-making.

Relative Risk Model

EHS Support's relative risk model takes a number of parameters into account through a stepwise, iterative process. In addition to considering compound-specific characteristics such as persistence, mobility, and toxicity, our model also incorporates site-specific information and uncertainties to develop a site-specific, relative risk ranking for detected PFAS. This ranking provides a basis for alternative strategies that are focused on more realistic site- and compound-specific risk, particularly in the absence of regulatory criteria.

Our relative risk model uses a tiered, screening assessment framework based on those used for the assessment of chemical contaminants in traditional risk assessment, conducted under current regulatory programs such as Superfund and RCRA. The goal of this model is to categorize or assign PFAS into low-, medium-, and high-risk tiers based on their relative risk. Parameters include chemical classification, human and ecological toxicity, environmental persistence and occurrence, bioaccumulation/biomagnification, and information based on a site-specific, conceptual site model. The framework also incorporates an uncertainty analysis to assess the impact of different sources of uncertainty for a specific dataset. Lacking criteria and toxicity data for most PFAS, regulators are particularly conservative in their analysis of site-specific data. In some cases, a detection of PFAS, even well below any regulatory or health-based standards, may lead regulators to require more sampling. Our model helps the site owner and regulator understand the potential for exposure and provides context for the risk attributable to PFAS detections. This context in turn provides a science-based rationale against ongoing collection of data with no viable data quality objective.

BENEFITS AND USES OF THE MODEL

EHS Support has validated the model and approach for a range of site-specific groundwater data sets to demonstrate feasibility and flexibility of this evaluation. It can be used in site rankings, risk communication, risk management, financial reserve assessments, and potentially responsible party (PRP) cost allocation, as well as in regulatory program negotiation and assessment.

A groundwater detection at a site that has never used PFAS and has no reason to believe the site is a source can result in long-term, costly monitoring with no exit strategy. Even where it is determined that the site is not a source after multiple rounds of sampling, the lack of regulatory limits and relevant toxicity data for all congeners can result in continued requirement by the regulatory agency to perform time-consuming and expensive sample collection. EHS Support's relative risk model allows for a relative comparison that provides data-based definition of actual versus perceived risk to satisfy both the regulator and site owner.

Additional applications of the model include:

- Determining whether PFAS concentrations, or which PFAS at the site pose a threat
- Assessing or identifying the PFAS of greatest potential concern for a dataset
- Providing context for PFAS with uncertain toxicity
- Providing the basis for an exit strategy to avoid continued monitoring
- Assessing PFAS with no criteria
- Assessing criteria relevance and/or sensitivity
- Differentiating real versus perceived risk
- Putting risk in context to avoid an expansive sampling program
- Serving as a mechanism to explain/discuss uncertainty with regulators during on-going criteria development

NEXT STEPS

As the development of state and federal criteria continues, EHS Support's relative risk model provides a defensible, science-based alternative validation tool. In addition, we are currently in the process of further developing the fundamental framework to include other environmental media, such as soils and biota.

A sound, science-based strategy to assess PFAS is key to distinguishing true risk from potential risk and the potential impact to your bottom line.

EHS Support has a reputation for developing innovative approaches for client advocacy and offers a wide range of services to support your PFAS challenges in the changing regulatory landscape. Our relative risk model is just one of several science-based tools we have developed to support our clients in response to regulatory requests associated with PFAS at their sites.

EHS Support delivers multi-disciplined services that provide our clients with realistic and innovative solutions.

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