

## Addressing Emerging Contaminants in Groundwater Surveillance Monitoring

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Emerging Contaminants, such as per- and polyfluoroalkyl substances or PFAS, have become a challenging class of compounds globally due to their ubiquitous nature and inability to break down in the environment. They have been detected in many groundwater sources globally and proactive planning in groundwater surveillance programs is now a requirement. From Europe to Australia and across the United States, occurrence monitoring for PFAS has been initiated and/or is complete. All States monitored for 6 PFAS from 2013-2015 under the Safe Drinking Water Act as part of the Unregulated Contaminant Monitoring Rule (UCMR3) and dozens more PFAS are proposed to be included in the next UCMR cycle from 2023-2025. Several States have also taken on additional occurrence monitoring activities; some, such as Michigan, Pennsylvania and California, have completed or are nearing completion of occurrence monitoring by industry type well others such as Colorado, New Mexico, Wisconsin, and Minnesota have more recently begun efforts around PFAS. In Canada, some academic efforts have focused on occurrence monitoring as well.

In Alberta, as an example, monitoring programs are required to include emerging contaminants which may not previously have been identified as a source of risk: notably including PFAS. Alberta's Environmental Protection and Enhancement Act (EPEA) requires approval for certain designated activities. Operational approvals associated with many large facilities require ongoing soil and groundwater monitoring programs. New clauses in EPEA approvals issued by the AER divide the groundwater monitoring program into a surveillance monitoring program and separate contamination management program, aligning with Remediation Regulation and the approach taken in the Soil Monitoring Directive. Reporting requirements are reduced and program flexibility is increased; providing an opportunity for increased efficiency, and emphasizing the importance of clear rationale for the design of a monitoring program, however approval holders have less certainty that the program being implemented will be deemed compliant / acceptable to the regulatory Program Director. While offering opportunities, the new approach requires a re-evaluation of programs which may have been in place for years. It also places increased onus onto the approval holder to ensure that all potential contaminants have been considered, including emerging contaminants such as PFAS.

This presentation summarizes monitoring efforts completed to date globally, what trends can be gleaned from those efforts, and outlines key considerations for optimizing and maintaining a compliant groundwater surveillance program including guidance on how to make the best use of available historical information to appropriately adjust sampling frequency, and how to determine when and where PFAS contamination is a concern.

### Daniel Pollard

Daniel Pollard is a senior hydrogeologist for Wood with over 17 years of experience in assessing, managing and closing contaminated sites. While working at the Alberta Energy Regulator he was responsible for the oversight of contamination monitoring and remediation at large facilities, and development of operational policy and procedures, including a significant role in development of updated groundwater clauses, the AER Record of Site Condition and implementation of the Remediation Regulation.

### Shalene Thomas

Shalene Thomas, is Vice President and Global Emerging Contaminant Program Manager for Wood. A leading advisor on strategically managing emerging contaminant challenges, she has more than 20 years of experience as an environmental consultant including 13 years supporting clients in the US, Canada, Europe, Australia, and South America to address per- and polyfluoroalkyl substance (PFAS) risks in groundwater. Shalene is a passionate advocate for advancing innovative solutions to address PFAS contamination and manage and mitigate risk. Shalene co-leads the Interstate Technology Regulatory Council PFAS Aqueous Film Forming Foam sub-team to advance the state of PFAS science and practice.