

What is Remediation Geology and Why Should It be a Part of Every PFAS Remedial Investigation?

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Background/Objectives. Remediation geology is not only the development of a robust geologic model representative of the features that control subsurface fluid flow, but it is also the further application of the geology to integrate hydrogeologic characteristics and contaminant fate and transport to inform groundwater contamination remedies. Because of the ubiquitous occurrence of PFAS, high toxicity, and low retardation, a Best Practice for PFAS characterization would require a remediation geology approach to developing a conceptual site model (CSM) to drive the PFAS characterization field program. It is critical to first understand and define the geologic features that limit and control groundwater flow vis-a-vis PFAS migration and use that to target the PFAS/groundwater sampling program. It is imperative that a PFAS Remediation Investigation (RI) Quality Assurance Project Plan (QAPP) include a robust geology-based CSM to support the sampling program.

Approach/Activities. Air Force Civil Engineering Center (AFCEC) has recognized the critical role of remediation geology in the PFAS RI process and they have required that a PFAS RI be supported by an environmental sequence stratigraphy (ESS)-based CSM. ESS technology, as defined in the 2017 US EPA Technical Issue paper, promotes the development of a robust geologic model that combines the understanding of regional geology, depositional systems, and facies models to integrate the genetic relationships of subsurface materials into the interpretation and mapping out of subsurface features. It requires that the practitioner be a trained stratigrapher that has extensive experience in developing these geologic models.

Results/Lessons Learned. Over the past 10 years plus AFCEC has been applying ESS to contaminated groundwater CSMs at various scales for sites throughout the nation. They have recently kicked off a program comprised of over 40 Air Force facilities throughout the US that is focused on developing ESS-based CSMs to inform PFAS remediation at these facilities. This presentation will include the results and lessons learned from the application of remediation geology at selected sites.