Remediation of AFFF/PFAS-Impacted Soil by Sequestration and Natural Attenuation

Jeff Ramey (jramey@trccompanies.com) (TRC, Milwaukee, WI, USA)
Ken Quinn, PG (kquinn@trccompanies.com) and Todd Martin, PE (twmartin@trccompanies.com)

Background/ Objectives. In spring 2021, during due diligence of a natural gas peaking plant in Wisconsin, it was discovered that second generation aqueous film-forming foam (AFFF) was released onsite over time during the testing and certification of the facility's fire suppression system by a third party. The release of PFAS was confirmed by sampling and testing the shallow, potable water supply well and subsequently reporting the release to the regulatory agency.

Approach/ Activities. An expedited site investigation workplan (SIWP) that included an optional interim action for the remediation of soil and groundwater was submitted and approved by the agency within two weeks of reporting the release. The iterated soil and groundwater investigation determined the extent of soil contamination at the Site. An interim action workplan was developed and approved by the agency that included remedies focusing on sequestering PFAS impacted soil, eliminating groundwater infiltration pathways, and eliminating migration of PFAS in stormwater runoff. The remedies included asphalt capping, installation of a geosynthetic cover system, excavation and replacement of the Site's septic system and mound, and routing the potable water supply to a deep, unaffected industrial well and abandoning the shallow potable well. The workplan stipulated that the interim actions would be conducted only if the natural attenuation of PFAS impacted soils in a large, forested area of the Site would be accepted by the regulatory agency.

Results/ Lessons Learned. Source area interim actions can be implemented, enhancing the monitored natural attenuation option for groundwater, even before completion of the full groundwater investigation by understanding the release mechanisms and appropriately sequencing the soil and groundwater investigations. The interim actions were developed shortly after the initial soil investigation was completed in May 2021 and groundwater investigation is ongoing. The interim actions construction was completed in June 2022 and documented in a report to the agency in September 2022. About 1,000 tons of soil was excavated from the septic mound area and transported to and disposed of in a Subtitle C hazardous landfill. All soil at the Site directly contacted from the release of AFFF during the testing and certification of the fire suppression system are now capped and the source of PFAS mass flux to groundwater through infiltration has been eliminated along with the migration of PFAS mass to the forested area by stormwater allowing natural attenuation. This presentation will focus on remediation through interim actions and achieving regulatory agreement on a natural attenuation remedy but a robust groundwater dataset exists at this Site from the installation and quarterly sampling of seven water table monitoring wells, one deep piezometer, and five Westbay® multiport monitoring wells with eight sample ports. Groundwater sampling of the existing monitoring well network has been conducted since completion of the interim actions and will continue in calendar year 2023.