FULL-SCALE REMEDIAL DESIGN AND IMPLEMENTATION FOR A PFAS SITE IN NORTH CAROLINA

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Background/Objectives:

Historical manufacturing practices at an industrial plant in North Carolina resulted in per- and polyfluoroalkyl substances (PFAS) impacts to soil, groundwater, and surface water beneath the plant property, as well as the surrounding area due to airborne deposition. PFAS impacts to groundwater beneath the plant property were, prior to remedial action, migrating downgradient to discharge to nearby wetlands, surface water, and an adjacent river. While the plant has historically operated and is currently operating well within environmental laws and regulations, the operating company elected to proactively address current operations to eliminate PFAS air emissions and PFAS impacts in natural media beneath the site so as to minimize potential PFAS migration and discharge to surface water. The operating company also manages a large proactive offsite sampling program wherein private drinking water wells surrounding the plant are sampled. Where PFAS impacts are detected, remedial actions are immediately implemented to address the PFAS impacts and ensure clean drinking water is provided to the public.

Approach/Activities:

The operating company adopted a proactive approach to reduce PFAS emissions and impacts in 2019, starting with the installation of a large thermal oxidizer to destroy PFAS in the plant discharge vapor stream and eliminate potential arial transport and deposition. On-site interim actions were then implemented consisting of the installation of solar powered groundwater extraction systems to remove PFAS impacted groundwater and reduce potential contaminant mass flux to surface water. Interim actions were also rapidly implemented in surface water seeps and streams to reduce surface water transport of PFAS to the adjacent river. These surface water interim actions consisted of innovative, first of their kind in-stream granular activated carbon sorption systems that removed PFAS as it flowed through the systems prior to discharge into the river. Finally, in 2023 a large soil mixed grout wall, more than 1 mile in length, was installed to a depth of greater than 80 feet below ground surface along the downgradient side of the manufacturing plant property and a 1,500 gallon per minute groundwater extraction and containment system was installed on the upgradient side of the wall to entirely contain groundwater beneath the site and prevent all potential PFAS discharge to surface water. After the barrier wall and hydraulic containment system were commissioned and demonstrated to meet objectives, the interim remedial systems were gradually decommissioned. This site is now in operation and maintenance and is expected to operate in this mode for the foreseeable future.

Results/Lessons Learned:

The proactive measured approach adopted by the operating company at this plant site most effectively and rapidly addressed PFAS discharges to the environment. By first focusing on source control and discharge vector control PFAS mass flux was sharply reduced first by interim actions followed by the full-scale, sitewide containment remedy. This focused strategy resulted in rapid PFAS discharge reduction, early protection of offsite water resources, and ultimately protection of people and the environment on an accelerated timeline. This presentation will focus on remedial strategy, design, and implementation onsite and lessons learned during strategy development as well as remedy component implementation.

About The Author

Daniel (Dan) Griffiths, CPG, PG, brings both a strong classical geological science education and extensive experience to a wide variety of projects, focusing on streamlined site delineation and innovative remedial design and implementation. He has been designing and implementing investigation plans at industrial and Department of Defense (DoD) sites for more than 27 years, specializing in complex high priority sites impacted with chlorinated solvents, metals, explosive constituents, and emerging contaminants including per and polyfluoroalkyl substances (PFAS) and 1,4-Dioxane. He is a contributing author on guidance documents for in-situ remediation prepared by Parsons for the Air Force and Environmental Security Technology Certification Program (ESTCP) and he is a contributing author on the Interstate Technology and Regulatory Council (ITRC) PFAS and emerging contaminants team. Mr. Griffiths is also a Parsons Fellow, the Innovation and Technology Director, and Senior Science Advisor for emerging contaminants like PFAS.