Review of Potential PFAS In-situ Remediation Technologies

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**Background:**

Significant research is underway to develop and implement innovative in-situ remediation solutions to tackle PFAS, or per- and polyfluoroalkyl substances pollution. This presentation focuses on the breakthrough techniques that are shaping the future of PFAS in-situ remediation.

**Discussion:**

In-situ Chemical Oxidation (ISCO) is a powerful method for treating PFAS-contaminated groundwater. Questions remain about the toxicity of the breakdown products and research continues to address this issue. Typically to reach very low concentrations implementing bioremediation is needed following ISCO. Advanced Oxidation Processes (AOPs) combine the power of multiple oxidants and catalysts to destroy PFAS contaminants.

Adsorption techniques like Granular Activated Carbon (GAC) and Ion Exchange (IX) have shown great promise for In-situ application acting as a plume stabilizer. Research is being conducted to determine the types of CAC and IX are most effective.

Bioremediation and bioaugmentation shows potential as a natural way to break down PFAS. Researchers have recently discovered that certain naturally occurring microbial communities amd enzymes have the ability to break down PFAS chemicals, particularly perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS).

Plant uptake and translocation studies have shown that certain plant species are capable of taking up PFAS from the soil and translocating them to aboveground tissues. The rhizosphere—the narrow zone of soil surrounding plant roots—plays a critical role in plant-pollutant interactions.

**Conclusion:**

PFOS and PFAS compounds are very difficult to remove from the environment. Current research provides great insights on how technology may be applied to find cost effective methods for in-situ treatment of these compounds.