PFAS research and development at WSP

Remediation and treatment

At WSP, we have a team of over 100 experienced PFAS subject matter experts that collaborate, innovate, and share best practices and the latest trends in the scientific and regulatory landscape from around the world. These experts are working to solve local problems across all market sectors, including government, infrastructure, waste, industrial, power, oil and gas, and mining, and can bring a wealth of knowledge to your site.

DECODING PFAS AND DELIVERING RESULTS

Discovering new ways to resolve the environmental challenges of our era is exactly where WSP thrives. We have been addressing PFAS impacts since the days when this emerging class of contaminants was still unknown to many.

Today, we continue to lead the way with practical and innovative approaches and breakthrough technologies to help clients overcome the challenges posed by PFAS. Through applied research into PFAS testing, assessment, and treatment, we are breaking new ground in investigation, cleanup and destructive treatment of these challenging contaminants.

RESEARCH AND DEVELOPMENT

Our experts have been collaborating with academia and industrial partners to find the most effective solutions to challenges presented by PFAS. Our active applied research and development activities include:

- Electro-oxidation (EO) destruction of PFAS in groundwater, industrial and other PFAS-containing aqueous waste streams
- Ball milling destruction of PFAS in soil
- Modified clay mineral mediated in situ and ex situ treatment in all environmental media

The U.S. Environmental Protection Agency's (EPA) PFAS Innovative Treatment Team has identified EO and ball milling as being among four "promising technologies for destroying PFAS."

https://www.epa.gov/chemical-research/pfas-innovative-treatment-team-pitt

Treatment of PFAS is challenging. Despite significant efforts by the environmental industry in the last decade, sustainable and reliable remediation solutions for removal of PFAS from the environment remain inadequate. The PFAS research and development activities at WSP aim to solve these problems.

Electro-oxidation – an efficient way to destroy PFAS in effluent streams

The WSP EO technology uses a unique kind of long-lasting boron-doped diamond electrodes. With this technology, the PFAS-laden water passes by an array of electrodes, a positively charged anode, and a negatively charged cathode. The anode generates the oxidation process and forms oxidizing radicals and electrons, that, through a complex chemical process, break down the PFAS molecules into carbon dioxide and fluorides. The cathode produces primarily hydrogen gas and provides reduction reactions that treat oxidation byproducts not addressed by most other oxidation-based technologies. A perchlorate scavenger process has been developed to further ensure the best possible treatment results.

The WSP EO technology has been successfully tested to destroy PFAS below stringent environmental standards for several jurisdictions worldwide. The technology is effective for all types of PFAS, scalable, long-lasting and typically treats PFAS in one to two hours, thereby making the technology highly efficient with minimal operation and maintenance requirements. The technology has been successfully tested and optimized in the lab on several effluents and is ready for commercial applications.

Ball milling – a destructive solution for soil

The absence of proven cleanup technologies for PFAS in soil and sediment, limits treatment of source areas. Since 2018, WSP and our collaborators have worked to develop an innovative approach to destroying PFAS using ball milling.

Recent results from lab testing demonstrate that ball milling can be an effective PFAS destruction technology for impacted soils and, best of all, avoids many of the limitations associated with current remedial approaches. Trials using aqueous film-forming foam impacted sand and clay soils from a firefighting training area demonstrated the technical viability. Enhanced destruction kinetics were realized when potassium hydroxide (KOH) was added as a co-milling reagent.

For example, while milling without KOH requires approximately one hour to achieve a 94% level of destruction, when co-milling with KOH, a similar level is reached within the first 15 minutes of testing.

The team is now working on further optimization, scaling and near-future field implementation undertaken as part of a Natural Sciences and Engineering Research Council of Canada Collaborative Research and Development Grant.

Modified clay – reactive treatment and superior sorption

WSP, together with academic and industry partners, initiated a new applied research and development project to develop a destructive sorbent for PFAS. The approach uses reactive and self-regenerating Fe-containing clay minerals for remediation of PFAS source zones via sorption and radical-accelerated PFAS degradation. In parallel, we will advance the modified bentonite adsorbents technology to demonstrate that low-cost clay adsorbents are superior alternatives to other sorbent materials (e.g., granular activated carbon, ion exchange resins) with high fouling resistance.

ABOUT WSP

As one of the world's leading professional services firms, WSP exists to future-proof our cities and environment. We provide strategic advisory, engineering, and design services to clients in the transportation, infrastructure, environment, building, power, energy, water, mining and resources sectors. Our 55,000 trusted professionals are united by the common purpose of creating positive, longlasting impacts on the communities we serve through a culture of innovation, integrity and inclusion. Sustainability and science permeate our work.

CONTACT US

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