***Entries for August 1-15, 2025***

**Market/Commercialization Information**

**EPA R4 START REQUEST FOR PROPOSALS (SOL)**
U.S. Environmental Protection Agency, Region 4 Contracting Office, Atlanta, GA
Contract Opportunities on SAM.gov 68HE0P24R0007, 2025

This is a full and open competition under NAICS code 541620. EPA Region 6 requires a contractor to provide nationally consistent technical assistance services to EPA OSCs and other federal officials implementing EPA's responsibilities under the national response system for the Superfund Technical Assessment and Response Team (START) class of contracts. These services primarily support Region 4 states (AL, FL, GA, KY, MS, NC, SC, and TN) and six Tribes (Catawba Indian Nation, Eastern Band of Cherokee Indians, Miccosukee Tribe of Indians of Florida, Mississippi Band of Choctaw Indians, Poarch Band of Creek Indians, and Seminole Tribe of Florida). Interested firms shall be prepared to provide scientific/technical support and align their activities with EPA activities to further the Agency's primary mission: The protection of human health and the environment. Contract responsibilities include providing: 24-hour, seven-day-a-week response activities, including emergency, counterterrorism, oil spill, federal disaster, Potentially Responsible Party, and minor containment response, and fund-lead removals; Preparedness and Prevention Activities; Assessment/Inspection Activities; Technical Support Activities; Data Management and Mapping Support; and Training. Offers are due by 12:00 PM EDT on October 2, 2025. https://sam.gov/workspace/contract/opp/843567862e7c41cfbf30b4eb65d9c6e1/view

**FORMOSA MINE SUPERFUND SITE, OPERABLE UNIT 1 (OU1) REMEDIAL ACTION PROJECT, RIDDLE, OREGON (SOL)**
U.S. Army Corps of Engineers, Northwestern Engineer Division, Seattle
Contract Opportunities on SAM.gov W912DW25R0008, 2025

This is a total small business set-aside under NAICS code 562910. The U.S. Army Corps of Engineers Northwestern Engineer Division, Seattle District is seeking a contractor for the Formosa Mine Remedial Action Capping Project. The project scope of work consists of activities necessary to implement primarily the earthwork-related requirements of the EPA's ROD for the Formosa Mine Superfund site OU 1. OU1 includes all surface and subsurface mine materials deposited outside of the underground mine workings and considered "source materials" for the site, including materials excavated during construction and operation of the mine. The RAO is to remove, consolidate, and restrict or minimize the interaction of contaminant source materials with precipitation, surface water runoff, and groundwater to prevent direct exposure to mine waste with elevated metal concentrations and reducing acid rock drainage generation, reducing impacts on groundwater and surface water. The specific project SOW includes stabilizing the steep EM slopes with gabion walls; development of a clean materials borrow area and non-primary mine disturbance area (PDMA) mine material repository; grading and consolidating mine materials in the non-PMDA mine material repository; impermeable cover construction on the EM, former ore storage/million-gallon storage tank, and non-PMDA mine material repository; grading, amendment and revegetation of mine materials at the area southwest of the EM, and Formosa Adit 2, Formosa Adit 3, and 1090 Raise WRDs; and excavating mine materials from roads, reconstruction of roads within the project limits, and constructing a steep slope northwest access road for gabion wall placement. The award will be a firm-fixed-price contract with a 120-calendar-day period of performance. Offers are due by 2:00 PM PDT on October 31, 2025.
https://sam.gov/opp/679004e5d6b84e569402b57470daa5ab/view

**FY26 BROWNFIELDS JOB TRAINING (JT) GRANTS**
Environmental Protection Agency, Funding Opportunity EPA-I-OLEM-OBLR-25-01, 2025

This notice announces the availability of funds and solicits applications from eligible entities, including nonprofit organizations, to deliver Brownfields Job Training programs that recruit, train, and place local, unemployed, and under-employed residents with the skills needed to secure full-time employment in the environmental field. Brownfields Job Training Grants fund training programs that provide program graduates with the skills and opportunity to seek and obtain environmental jobs that contractors may otherwise fill from outside the affected community. They help residents take advantage of jobs across a spectrum of brownfield- related activities, including the assessment, cleanup, remediation, and planning/site preparation for the revitalization of brownfields. This can involve assessing and cleaning up solid and hazardous waste; chemical risk management; stormwater management relating to site cleanup; planning and site preparation for low-impact development activities; site preparation for green infrastructure installation; and vulnerability assessment and contamination mitigation planning. EPA urges applicants to review the FAQs, which can be found at https://www.epa.gov/brownfields/frequently-asked-questions-about-brownfields-job-training-jt-grants. It is anticipated that up to 20 awards will be made under this announcement. The amount of funding is expected to be $10,000,000 - $14,000,000, depending on Agency funding levels, the quality of applications received, agency priorities, and other applicable considerations. Awards funded under this opportunity are expected to have up to a 5-year project period. Applicants may apply for up to $500,000 of EPA funds. The closing date and time for receipt of applications is September 26, 2025 at 11:59 pm ET. https://simpler.grants.gov/opportunity/8d860e9c-9786-49c4-bb98-89ec895476d7

Return to top

***Cleanup News***

**OPTIMIZING PFAS PLUME REMEDIATION: GAS SPARGING AND PARTIALLY PENETRATING PUMP-AND-TREAT SYSTEMS**
Robinson, S.T., P.R. Kulkarni, E.B. Stockwell, K. Schmeltzer, J. White, J. Scalia, and C.J. Newell I Remediation 35(4);e70031(2025)

This article presents an approach to more efficiently capture and treat PFAS plumes by using gas sparging to concentrate PFAS in the upper portion of an aquifer, followed by a shallow extraction approach that uses partially penetrating wells designed to pump only the upper concentrated zone. A web-based Capture Zone Calculator Tool was developed based on published graphical capture zone curves in the groundwater literature to determine minimum pumping rates for both fully and partially penetrating wells, showing reductions in required pumping rates when PFAS are concentrated in a thinner zone. Cost estimates using EPA's GAC costing model for three AFFF-impacted sites suggest that incorporating gas sparging could reduce total project costs by up to 24% over 20 years. These findings indicate that a "gas sparging + targeted pump-and-treat" strategy is technically feasible and may offer modest economic benefits for PFAS plume containment. However, the potential cost savings may not be sufficient to drive widespread adoption. As a result, the primary role of gas sparging in PFAS remediation may be to mobilize PFAS from groundwater into the vicinity of the water table, either as a standalone method or combined with sorbents placed near the capillary fringe.

**LONG-TERM FIELD STUDY OF A PERMEABLE REACTIVE BARRIER FOR GROUNDWATER CLEAN-UP AT AN ACID BATTERY RECYCLING SITE**
Lawrinenko, M., L. Rhea, J. Fields Jr, and R.T. Wilkin
Journal of Hazardous Materials 497:139579(2025)

Operations at a former battery recycler resulted in harmful concentrations of lead and other contaminants in groundwater. A long-term monitoring study of a permeable reactive barrier (PRB) strategically deployed to intercept and treat groundwater using limestone and organic material (cattle manure and woodchip) was conducted. The PRB neutralized groundwater acidity and created reducing conditions to drive sulfate reduction to sulfide by native bacteria. Increased pH and precipitation of low-solubility metal sulfides sequestered lead, cadmium, nickel, and zinc. The PRB also effectively removed acidity via limestone dissolution and carbon mineralization over 14 years. No measurable evidence of PRB clogging or limestone armoring was observed over the 14-year monitoring period. Groundwater flow monitoring indicated a minor amount of bypass around the PRB. Analysis of core samples collected 14 years into operation revealed uptake of aluminum, cadmium, copper, iron, lead, and zinc within the PRB and downgradient soil. Scanning electron microscopy revealed co-precipitation of nickel with pyrite and precipitation as oxides with cubic and acicular morphologies. Lead was found in mixed precipitates, notably as sulfides. Reducing conditions precluded capture of arsenic and phosphorus, which remained mobile in groundwater. While metal contaminants were safely sequestered as minerals in the PRB and in downgradient soil, risk for future re-mobilization may occur with potential return to acidic conditions.
https://www.sciencedirect.com/science/article/pii/S0304389425024987/pdfft?casa_token=_708m1ZYmd4AAAAA:epsszUo3jzrMvXIEWPCmEfLawUg1506jjIPsMA1zzbBpCp8yT8bm4nyQZKebuBVtLzvzwB7C&md5=00d8a93f0d09d0d6584a4fada24db50f8

**COLLOIDAL ACTIVATED CARBON BARRIER TO REDUCE PFAS MIGRATION INTO THE OAKLAND INNER HARBOR**
Nunez, D. I 20th Annual Environmental Professionals of Arizona Conference, 3-4 March, Tempe, AZ, 23 slides, 2025

Historical use of PFAS-containing fire suppression foam at Installation Restoration Site 14 resulted in significant groundwater contamination into the First Water Bearing Zone, ~1 to 8 feet bgs. Initial testing revealed contamination levels of PFOA (1,100,000 ng/L), PFOS (230,000 ng/L), and PFBS (16,000 ng/L), threatening the adjacent Oakland Inner Harbor and a proposed shoreline park. A remedial investigation was conducted for PFAS, followed by a design verification study and pilot test to evaluate a PlumeStop® CAC permeable reactive barrier (PRB) as a mitigation strategy to minimize the flow of PFAS-impacted groundwater into the harbor. The 720-foot PRB was strategically placed along the shoreline in two parallel rows. Before full-scale implementation, a thorough design verification and testing phase ensured the PlumeStop barrier would meet project goals. This phase included both lab and field testing to optimize performance. Passive flux meters installed in monitoring wells provided critical data on groundwater flow rates and PFAS flux. These segmented devices, incorporating activated carbon and resin layers, ensured precise PRB placement and dosing while informing barrier design and performance evaluation. Two injection trailers and two direct-push rigs were deployed to inject 340,000 lbs of PlumeStop mixed with water for a liquid volume of >100,000 gals applied through 290 injection points. To address potential migration challenges, calcium chloride ($CaCl_2$) was added in certain areas to prevent the CAC from entering nearby storm sewer lines. This "bottom-up" injection approach, performed in five 3-ft intervals per boring, maximized contact between the CAC and PFAS-contaminated groundwater. Despite challenges, the project was completed on schedule, delivering a stable and effective in situ barrier. The PRB has achieved nearly 100% PFOS and PFOA reduction within the treatment zone across all three transects. https://www.epaz.org/assets/docs/Conference/2025/Bedrock%20-%20Day%2002%20-%2002%20-%20Dan%20Nunez%20-%20Regenesis.pdf

Return to top

***Demonstrations / Feasibility Studies***

**IN SITU TREATMENT OF CHLORINATED VOLATILE ORGANIC COMPOUNDS (CVOCS) WITH A DEEP ACTIVE CONFIGURATION HORIZONTAL REACTIVE TREATMENT WELL (HRX WELL®)**
Divine, C., J. Wright, O. Day, A. Baumeister, D. Liles, M. Kladias, M. Lubrecht, D. Ombalski, H. Voscott, C. Norton, and L. Madore.
Remediation 35(4):e70033(2025)

Previous Horizontal Reactive Treatment Wells (HRX Well) have operated in a passive configuration, where groundwater preferentially flows into the HRX Well due to hydraulic conductivity contrasts between the aquifer and the well. This article presents the results of the first field demonstration of an HRX Well designed with a pump to enhance flow through the well (termed active configuration). Based on the results of treatability tests and design modeling, a dual-screen 8-inch diameter HRX Well was constructed. The total well length was 1,190 ft long with a target treatment depth of 125 ft. The inlet and outlet screens were both 40 ft in length, and the available treatment segment length was 65 ft. The treatment segment was equipped with multiple removable cartridges containing zero valent iron and GAC to treat CVOCs. The HRX Well operated with minimal operation and maintenance activity for 2.3 years, and a treatment efficiency of 100% for target CVOCs was maintained throughout the performance period. The estimated average treatment zone width was at least 70 ft. and ~55,000 gals of groundwater were treated. Overall, the study further confirms the HRX Well concept and highlights the benefits and implementability of the active configuration, which increases treatment zone size and allows the ability to prescribe specific flow rates.

**FURTHERING THE CAPABILITIES OF DIFFUSIVE-GRADIENT PASSIVE SAMPLERS FOR PER- AND POLYFLUOROALKYL SUBSTANCES**
Snook, J., J. Becanova, S. Vojta, and R. Lohmann.
Environmental Science & Technology 59(19):9744-9753 (2025)

This study builds on previous PFAS-diffusive gradient in thin film sampler (DGT) studies by introducing a redesigned diffusive gradient sampler for PFAS in water. Twenty-five PFAS were reliably measured in water, consistent with diffusion theory. Diffusion and whole-sampler uptake rates consistently agreed with model predictions within ±50% relative difference, including when tested at cold temperature (5°C). In field and lab deployments, DGT samplers measured PFAS concentrations within ±23% of grab sample results on average in each case, showing better performance than codeployed microporous polyethylene tube passive samplers. Based on the evidence, the DGT passive sampler is a promising tool for consistent and accurate passive sampling of PFAS in natural waters.

**CHEMOMETRIC AND MODELING ANALYSIS OF PFAS COMPOUNDS FOLLOWING COLLOIDAL ACTIVATED CARBON INJECTION**
Zenker, M. I International Symposium on Bioremediation and Environmental Biotechnology, 23-25 June, Boston, MA, 21 slides, 2025

This presentation describes the emplacement methodology and interpretation of monitoring results of a pilot-scale PlumeStop® injection designed to reduce mass discharge of PFAS in groundwater. Historic usage of AFFF has created impacts to shallow groundwater at NASA's Kennedy Space Center, which have the potential to migrate to surrounding surface waters. The pilot study created a shallow permeable reactive barrier (PRB) within an area impacted with elevated PFAS concentrations and potential surface water discharge risks. In addition to evaluating the overall success of the PRB, the presentation evaluates the occurrence of back diffusion and changes in PFAS chemical distribution downstream of the PRB.
https://ntrs.nasa.gov/api/citations/20250005854/downloads/BATTELLE%20BIOREMEDIATION_2025_PPT_Final.pdf

**INVESTIGATION OF PFAS REJECTION BY CLOSED-CIRCUIT REVERSE OSMOSIS AND NANOFILTRATION AND SORPTION TO TREATMENT MATERIALS DURING GROUNDWATER TREATMENT: A PILOT DEMONSTRATION**
Masters, N.A., B.A. Marron, A. Lau, W.G. Bailey, S.D. Richardson, and C.L. Bellona.
Separation and Purification Technology 377(Part 1):134308(2025)

The rejection of a broad range of PFAS by reverse osmosis (RO) and nanofiltration (NF) was evaluated using a pilot closed-circuit membrane system operating at 80, 85, and 90% recoveries treating AFFF-impacted groundwater (total PFAS ~ 14.3 µg/L). An evaluation of the membranes focused on 15 PFAS measured in the groundwater above 75 ng/L, including carboxylates, sulfonates, fluorotelomer sulfonates, and sulfonamides, dominated by PFOS. RO required higher pressures and energy to reach recovery setpoints than NF, in exchange for PFAS-specific rejections >99%. Rejection by NF ranged from 97.9 to 99.8% and was impacted by functional group (carboxylates > sulfonates, fluorotelomer sulfonates > sulfonamides) and increased by increasing chain lengths. Overall, PFAS rejection by RO decreased between 85 and 90% recovery, with discrete sampling demonstrating a decrease in rejection after 87% recovery, indicating that the tradeoff between reduced retentate volume and decreased permeate quality is an important operational consideration. Methanol extractions were performed on pretreatment materials and one BW30 element to evaluate PFAS sorption to treatment materials. Adsorbed total PFAS mass was dominated by PFOS, with long-chain PFAS exhibiting preferential adsorption. Per gram of material extracted, a 0.2 µm cartridge filter accumulated the most PFAS. The membrane and IX softening resin had similar accumulation of PFAS, while accumulation was the lowest on greensand. PFAS chain length had the greatest impact on adsorption to the filter, membrane, and IX softening resin, sorption to greensand was more impacted by functional group.

Return to top

***Research***

**CHAPTER TWELVE - DEFLUORINATION OF PFAS BY ACIDIMICROBIUM SP. STRAIN A6 AND POTENTIAL APPLICATIONS FOR REMEDIATION**
Jaffe, P.R., S. Huang, J. Park, M. Ruiz-Urigüen, W. Shuai, and M. Sima.
Methods in Enzymology 696: 287-320(2025)

*Acidimicrobium sp.* strain A6 is a recently discovered autotrophic bacterium capable of oxidizing ammonium while reducing ferric iron and is relatively common in acidic, iron-rich soil. The genome contains sequences for several reductive dehalogenases, including a gene for a previously unreported reductive dehalogenase, *rdhA*. Incubations of strain A6 in the presence of perfluorinated substances, such as PFOA or PFOS, have shown that fluoride, as well as shorter carbon chain PFAAs (perfluoroalkyl acids), are being produced, and the *rdhA* gene is expressed during these incubations. Results from initial gene knockout experiments indicate that the enzyme associated with the *rdhA* gene plays a key role in PFAS defluorination by strain A6. Experiments focusing on the defluorination kinetics by strain A6 show that the defluorination kinetics are proportional to the amount of ammonium oxidized. To explore potential applications for PFAS bioremediation, PFAS-contaminated biosolids were augmented with Fe(III) and strain A6, resulting in PFAS degradation. As the high demand of Fe(III) makes growing strain A6 in conventional reactors challenging, and since strain A6 was shown to be electrogenic, it was grown in the absence of Fe(III) in microbial electrolysis cells, where it oxidized ammonium and degraded PFAS.

**COMPOUND IMPACTS OF FLUVIAL FLOODING AND SEA-LEVEL RISE ON BENZO[A]PYRENE TRANSPORT IN THE LOWER DARBY CREEK AREA SUPERFUND SITE, PENNSYLVANIA, USA**
Woznicki, S.A., J. Barber, J.B. Butcher, J. Essoka, M. Harris, M. Mehaffey, B. Pluta, A. Shabani, and P.Y. Whung. I ACS EST Water 5:3613-3627(2025)

The compound effects of fluvial flooding, tidal dynamics, and sea-level rise were assessed on benzo[a]pyrene (B[a]P)-contaminated sediments in the Lower Darby Creek Area (LDCA) Superfund site. The LDCA is tidally influenced via the Delaware Bay, is projected to experience sea-level rise, and is situated within an active river floodplain, leading to potential B[a]P transport within and out of the LDCA. A one-way coupling of the Hydrologic Engineering Center-River Analysis System model and the Water Quality Analysis Simulation Program was used to demonstrate that by 2050, fluvial flooding will continue to be the major driver of contaminant transport in the LDCA system. Fluvial-driven sediment transport defines B[a]P deposition, which is largely influenced by tributary inputs and the distribution of B[a]P in floodplain sediments. The complex patterns of B[a]P redistribution at the LDCA, influenced by multiple drivers of flooding, demonstrate the utility of a coupled modeling approach to inform remediation and community resilience.
https://pubs.acs.org/doi/pdf/10.1021/acsestwater.4c00814?ref=article_openPDF

ADVANCED METHANOTROPHIC BIOREACTOR DESIGN FOR EFFICIENT BIOREMEDIATION OF HYDROGEN SULFIDE ($H_2S$) AND VOLATILE ORGANIC COMPOUNDS (VOCS): INTEGRATING GENETIC ENGINEERING AND INDUSTRIAL SCALABILITY
Serroune, S.A., J. Sopaheluwakan, K.D., F. Duclerc, and F. Liebert.
International Journal of Science and Research Archive, 14(01):830-881(2025)

The engineered *Methylomicrobium buryatense* strain 5GB1C-RO1 was optimized for the simultaneous removal of hydrogen sulfide ($H_2S$) and VOCs within a two-stage methanotrophic bioreactor system. Through precise CRISPR/Cas9-mediated genome editing, critical metabolic pathways for sulfide oxidation (SQR, FCCAB, SOXABXYZ) and VOC degradation (alkB, adhP, todC1C2BA) were integrated, achieving catalytic efficiencies exceeding 3.2 × 10⁷/M/s and substrate conversion rates above 450 nmol/min/mg protein. The strain demonstrates exceptional robustness under industrial conditions, maintaining 95% pollutant removal efficiency at $H_2S$ concentrations up to 1,000 ppm and VOC concentrations >500 ppm. The innovative bioreactor system incorporates enhanced gas-liquid mass transfer mechanisms, achieving mass transfer coefficients ($k_La$) exceeding 300/h and enabling stable operation for over 1,000 continuous hours. Experimental results confirm the system's capacity for pollutant mineralization, generating methane-rich biogas (>95% $CH_4$) and high-protein microbial biomass (>85%). The integrated bioremediation approach not only reduces reliance on chemical scrubbing and flaring but also supports circular economy principles by transforming waste gases into renewable resources. The findings highlight the potential of combining advanced genetic engineering with innovative bioreactor design to redefine industrial pollutant management and resource recovery. https://journalijisra.com/node/362

**INTEGRATING ANALYTICAL SOLUTIONS AND U-NET MODEL FOR PREDICTING GROUNDWATER CONTAMINANT PLUMES IN PUMP-AND-TREAT SYSTEMS**
Song, X., D.I. Demirkanli, Z. Hou, X. Lin, M. Karanovic, M.J. Tonkin, D. Appriou, and R.D. Mackley. I Advances in Water Resources 202:105002(2025)

This study introduces a novel approach that integrates analytical solutions for groundwater dynamics with the U-Net deep learning framework to predict groundwater contaminant plume migration under dynamic pumping conditions. By incorporating the Thiem equation into the input preprocessing, the U-Net model transforms sparse well data into a continuous spatial field that captures the hydraulic impacts of pumping activities. This integration enables the model to leverage both deep learning capabilities and classical physics-based groundwater theories, enhancing prediction accuracy and computational efficiency. In 2D synthetic cases, integrating analytical solutions reduced the RMSE from 2.76 μg/L to 0.7 μg/L. In a complex 3D heterogeneous model of the Hanford site's 200 West P&T facility, the model completed a 12-year simulation in just 600 ms on a single CPU core, achieving an accumulative RMSE of https://www.sciencedirect.com/science/article/pii/S0309170825001162

**WHAT WE LEARN FROM USING MASS BALANCE APPROACH AND OXIDATIVE CONVERSION – A CASE STUDY ON PFAS CONTAMINATED SOIL SAMPLES**
Wang, Q., P. van Hees, P. Karlsson, E. Jiao, M. Filipovic, P.K.S. Lam, and L.W.Y. Yeung.
Environmental Pollution 376:126420(2025)

This study introduced a stepwise analytical workflow for a comprehensive assessment of organofluorine, integrating total fluorine (TF) determination, extractable organofluorine (EOF) analysis, PFAS target analysis, and PFAS precursor oxidative conversion assay. The workflow was applied to ten field soil samples collected from AFFF-contaminated sites. The sum target PFAS concentration (ΣPFAS) ranged from 51.8 to 23,200 ng/g dry weight. PFOS was the predominant PFAS, accounting for 13-82% (mean value 53%) of the ΣPFAS. Target PFAS accounted for 1-80% of the EOF in the soil samples, and the integration of the oxidative conversion revealed additional EOF contributions ranging from 0 to 31%. However, a considerable proportion (20-94%) of unknown organofluorine persists after combining targeted PFAS analysis and the oxidative conversion, likely due to non-oxidizable PFAS, incomplete conversion of unknown PFAS precursors, and persistence of ultra-short chain PFAS post oxidative conversion. A significant positive correlation was observed between the oxidative conversion and EOF results, but not with PFAS target analysis, suggesting that the oxidative conversion may better represent the organofluorine burden in AFFF-impacted soil. Findings indicate that TF analysis is unsuitable for tracing PFAS contamination in soil. Instead, combining oxidative conversion with routine PFAS target analysis is recommended to comprehensively assess PFAS contamination in soil. https://www.sciencedirect.com/science/article/pii/S0269749125007936/pdfft?md5=ef5fc38f2a536909104452c30da45918a8&pid=1-s2.0-S0269749125007936-main.pdf

**HIGH-THROUGHPUT SCREENING OF MICROBIAL REDUCTIVE DECHLORINATION OF POLYCHLORINATED BIPHENYLS: PATTERNS IN REACTIVITY AND PATHWAYS**
Xu, G., H. He, D. Tang, Q. Lu, B. Mai, Z. He, L. Adrian, J. He, J. Dolfing, and S. Wang.
Environmental Science & Technology 59(15):7712-7721(2025)

A high-throughput in vitro assay approach was established for reductive dehalogenation (HINVARD), which increases dechlorination test throughput by 30-fold and enhances reagents and cell utilization efficiency by over 10-fold compared to conventional assay methods. Using HINVARD, 61 PCB congeners were screened across nine enrichment cultures and three *Dehalococcoides* isolates, identifying active dechlorination of 31-44 congeners. Results showed that PCB congener properties (chlorine substitution patterns, steric hindrance, and solubility) primarily determine the dechlorination potential, leading to consistent reactivity trends across cultures. In contrast, different organohalide-respiring bacteria catalyzed distinct dechlorination pathways, preferentially removing para- or meta-chlorines. Structural modeling of reductive dehalogenases revealed unique binding orientations governing substrate specificity, offering molecular insights into these pathways. Findings guide the design of tailored microbial consortia for effective PCB bioremediation.

Return to top

***General News***

**DESIGN PRINCIPLES OF CATALYTIC REACTIVE MEMBRANES FOR WATER TREATMENT**
Duan, Y.H., R.Y. Wang, A.N. Shocron, and M. Elimelech.
Nature Water 3:949-962(2025)

This article introduces key design principles of reactive nanofiltration membranes by systematically evaluating their performance using a modeling approach. For membranes with surface-loaded catalysts, avoiding mass transport limitations ensures effective catalyst utilization, whereas for membranes with interior-loaded catalysts, optimizing oxidant partitioning enhances oxidant utilization efficiency. Also, selective solute rejection reduces interference from natural organic matter, facilitating more selective contaminant transformation inside membrane pores. Contaminant transformation is dominated by surface-catalyzed reactions at low permeate water fluxes, while interior-catalyzed reactions dominate at high fluxes. Rejecting both oxidants and contaminants does not enhance surface-catalyzed treatment performance under an optimally designed scenario, highlighting the need for strategic design of membrane rejection. Nanofiltration membranes also minimize secondary contamination by rejecting the produced salts during the catalytic reactions. Strategic selection of oxidant-catalyst pairs can enhance treatment performance by generating suitable reactive species.

**AEROBIC COMETABOLISM REVISITED FOR IN SITU GROUNDWATER TREATMENT: ORGANISMS, ENZYMES AND REMEDIATION DESIGN CONSIDERATIONS**
Hatzinger, P.B., D. Lippincott, G. Lavorgna, and M.E. Fuller.
Bioremediation Journal [Published 28 July 2025 before print]

This paper reviews aerobic cometabolism and provides examples and guidance concerning its field application for traditional and emerging contaminants. https://www.tandfonline.com/doi/full/10.1080/10889868.2025.2535596?src=

**PER- AND POLYFLUOROALKYL SUBSTANCE TREATMENT TECHNOLOGIES**
Deng, Y., Q. Huang, and S.-Y. (Dora) Chiang (eds.). Royal Society of Chemistry Hardback ISBN: 978-1-83916-985-4, PDF ISBN: 978-1-83767-177-9, EPUB ISBN: 978-1-83767-178-6, 266 pp, 2025

This book provides a review of the current state of research in treatment technologies for removing PFAS from the environment, particularly water. It begins with a brief introduction to PFAS challenges and research needs and then covers established and promising technologies for PFAS removal from drinking water, wastewater, and groundwater. https://books.rsc.org/books/edited-volume/2335/Per-and-Polyfluoroalkyl-Substance-Treatment

**TECHNOLOGY STATUS TO TREAT PFAS-CONTAMINATED WATER AND LIMITING FACTORS FOR THEIR EFFECTIVE FULL-SCALE APPLICATION**
TECHNOLOGY STATUS TO TREAT PFAS-CONTAMINATED WATER AND LIMITING FACTORS FOR THEIR EFFECTIVE FULL-SCALE APPLICATION

This paper provides an overview of the existing treatment techniques to remove PFAS from contaminated water demonstrated at lab, pilot, and industrial scales, and their associated treatment mechanisms. Insufficient data on pilot-scale and full-scale applications have limited the optimization and advancement of the systems at a large scale. Most research related to PFAS-remediation is based on lab-scale studies under ideal conditions that do not represent the complexity of PFAS-contaminated media. Factors such as inhibition by competing background compounds and secondary water or air pollution limit the application of some PFAS removal techniques at full-scale. High energy intensity, cost, and inappropriate reactor design restrict the scalability of some proposed innovations. Integrated systems and treatment trains are proposed as potential approaches to effectively remove and destroy PFAS from contaminated waters. This review also offers and contextualizes implementation of barriers and scalable approaches for PFAS treatment. *This article is* ***Open Access*** *at* https://www.nature.com/articles/s41545-025-00457-3.

**PHYTOREMEDIATION POTENTIAL FOR RADIONUCLIDE REMOVAL FOLLOWING THE CHERNOBYL NUCLEAR POWER PLANT DISASTER**
Lincoln, E. and A. Noori.
International Journal of Phytoremediation [Published online 9 August 2025 before print]

The Chernobyl Nuclear Power Plant disaster released significant amounts of $^{137}Cs$, $^{90}Sr$, and $^{131}I$ across Europe and eastern areas of Russia, leading to widespread environmental contamination that negatively impacted human health and harmed flora and fauna in a variety of terrestrial and aquatic ecosystems. Long-term effects of the incident remain a persistent concern, particularly due to $^{137}Cs$ and various environmental and human-driven events that continue to resuspend radionuclides into the environment. Nearly four decades after the incident, various remediation efforts have been implemented, including physical, chemical, and biological approaches. However, no method has proven to be completely effective, and the significant remaining contamination necessitates the implementation of new strategies for remediation. Some of the most promising remediation techniques fall under bioremediation. This review article examines the environmental impacts of the Chernobyl fallout, evaluates remediation efforts over the past four decades, and explores emerging phytoremediation strategies that could enhance radionuclide removal from contaminated terrestrial and aquatic environments.

The Technology Innovation News Survey welcomes your comments and suggestions, as well as information about errors for correction. Please contact Michael Adam of the U.S. EPA Office of Superfund Remediation and Technology Innovation at adam.michael@epa.gov or (703) 603-9915 with any comments, suggestions, or corrections.

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