Entries for January 16-31, 2025

Market/Commercialization Information

MID-PLUME GROUNDWATER REMEDIATION AT THE WALTON & LONSBURY SUPERFUND SITE, ATTLEBORO, MASSACHUSETTS (SRCSGT)
U.S. Army Corps of Engineers, North Atlantic Division, New England District, Concord, MA
Contract Opportunities on SAM.gov W912WJ25X14TW, 2025

This is a sources sought notice for marketing research purposes only. The U.S. Army Corps of Engineers, New England District seeks to identify contractors under NAICS code 562910 capable of providing Environmental Remediation Services for the installation of a permeable reactive barrier, or treatment line, using zero-valent iron to reduce Cr(VI) to trivalent chromium in groundwater in the mid-plume area of the site southeast of the Walton & Lonsbury property in Attleboro, MA. The selected remedy for the mid-plume of this project involves installing a minimum 2.5-foot-wide treatment line located along the west side of North Avenue, spanning 209 ft from ~80 ft south of PDI-MID-03S to ~25 ft north of PDI-MID-04D (see provided site plan) to depths ranging from ~25 to 35 feet bgs, keyed into the underlying till. The reactive medium is a 63% ZVI/37% sand mixture by weight on average. Bench and Pilot Tests performed by HGL environmental consultants have ruled out injection delivery methods. This work is part of ongoing remediation activities in accordance with the Record of Decision. Responses to this Sources Sought announcement will be used by the Government to make appropriate acquisition decisions. Capability packages are due by 3:30 PM EDT on March 21, 2025. https://sam.gov/opp/5109e9bc77f54af4abbcd10fdc165219/view

F -- R7 WASHINGTON COUNTY LEAD DISTRICT -- FURNACE CREEK (SOL)
U.S. Environmental Protection Agency, Region 7 Contracting Office, Lenexa, KS
Contract Opportunities on SAM.gov 68HE0725R0014, 2025

This is an SBA-Certified women-owned small business (WOSB) program set-aside under NAICS code 562910. EPA Region 7 requires the services of an experienced firm to complete the remedial action for lead-contaminated soil at the Young Men's Christian Association (YMCA) Trout Lodge, Camp Lakewood and former Sunnen (camps) within Operable Unit 1 (OU1) at the Washington County Lead District (WCLD)--Furnace Creek Superfund Site in Missouri. The objective is to reduce the human health risk of exposure to lead by removing lead-contaminated material from the YMCA camps located within the WCLD-Furnace Creek site. EPA estimates ~332,607 ft² at the camps may be eligible and available for remediation during this current action. The OU1 ROD selected remedy for the site includes the excavation and disposal of qualifying lead-contaminated materials (mine waste, soil, gravel, crushed rock, vegetation, ground cover, etc.) from property restoration activities. Currently, residential properties with one or more non-drip zone areas with lead concentrations ≥ 400 ppm are eligible for remedial action. Additionally, per the January 2024 Updated Residential Soil Lead Guidance for CERCLA sites, properties with areas that have lead concentrations equal to or greater than 200 ppm are also being remediated. The award will be a Fixed Unit-Price, Indefinite-Delivery Indefinite-Quantity contract with a performance period from the date of award through three years thereafter inclusive of all required reports. Offers are by 2:00 PM CDT on March 26, 2025. https://sam.gov/opp/001cbdf194d824320901d29e51d30e3b9/view

F -- SCOTT AFB ORC SATOC (PRESOL)
U.S. Army Corps of Engineers, Great Lakes and Ohio River Division, Louisville, KY
Contract Opportunities on SAM.gov W912QR25RA017, 2025

When this solicitation is released on or about March 7, 2025, it will be competed as a full and open competition under NAICS code 562910. The U.S. Army Corps of Engineers (USACE) Louisville District seeks interested firms with the capability to execute a full range of environmental services for the Air Force Civil Engineer Center Optimized Remediation Contract at Scott Air Force Base (AFB) in Illinois. The primary objective of this contract is the remediation of soil and groundwater contaminated with a variety of contaminants including but not limited to PFAS, chlorinated solvents, petroleum products, and explosives constituents. The Contractor shall provide the capability to execute this range of services for Hazardous, Toxic and Radioactive Waste sites located at Scott AFB. The award is expected to be a Firm Fixed Price Single Award Task Order Contract (SATOC) with an ordering period of 10 years. There is no solicitation at this time.
https://sam.gov/opp/dd81faed5b804f25857d4080c849c079/view

F -- OPTIMIZED REMEDIATION CONTRACT (ORC) AT AIR FORCE PLANT 4 (AFP4), FORT WORTH, TEXAS (PRESOL)
U.S. Department of the Air Force, Air Force Installation and Mission Support Center, Joint Base San Antonio, Lackland, TX
Contract Opportunities on SAM.gov FA890325R0031, 2025

When this solicitation is released, it will be competed as an SBA-Certified Women-Owned Small Business (WOSB) program set-aside under NAICS code 562910. The U.S. Department of the Air Force requires a contractor to perform environmental remediation activities to achieve the performance requirements at 24 Installation Restoration Program (IRP) sites at Air Force Plant 4 (AFP 4) in Fort Worth, Texas. AFP 4 occupies ~726 acres, manufactures aircraft for the Air Force, and is operated by Lockheed Martin. The Air Force desires that all sites be remediated to standards that allow for the current or reasonably anticipated future land use of the property. The Period of Performance includes a one-year base period and nine one-year options periods. Comments, questions, or concerns must be submitted to the Contracting Officer and Contract Specialist by the close of business on March 7, 2025, using the Excel document provided in this announcement. The Government will review all questions received and will post the questions and answers on SAM.gov on March 14, 2025. There is no solicitation at this time. https://sam.gov/opp/52cb9a57709c42d295b7d0e889acd96e/view

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Cleanup News

ANALYSIS OF FACTORS AFFECTING PLUME REMEDIATION IN A SOLE-SOURCE AQUIFER SYSTEM, SOUTHEASTERN NASSAU COUNTY, NEW YORK
Fienen, M.N., N. Corson-Dosch, F. Stumm, P.E. Misut, K. Jahn, J. Troyer, C.E. Schubert, D.A. Walter, J.S. Finkelstein, J. Monti Jr., D.J. St. Germain, J.H. Williams, and J.C. Woda. Scientific Investigations Report 2024-5086, 108 pp, 2024

Several plumes of dissolved, chlorinated solvents, including TCE, were identified in a sole-source aquifer near the former Northrop Grumman Bethpage Facility and Naval Weapons Industrial Reserve Plant sites in New York. Past investigations also documented that the groundwater contamination extends to the south, in the direction of groundwater flow. Detailed groundwater-flow modeling was needed for the New York State Department of Environmental Conservation (NYSDEC) to evaluate design options necessary to construct, operate, optimize, maintain, and monitor a groundwater extraction and treatment cleanup plan to comprehensively address the plumes. NYSDEC worked with U.S.G.S. to better understand the local hydrogeologic framework using two independent approaches to characterize aquifer heterogeneity and update an existing regional groundwater-flow model to provide transient boundary conditions for new inset groundwater-flow models of the plume area. Detailed inset models were developed for the two independent aquifer characterizations using history-matching techniques coupled with a novel approach to risk-based management optimization of the remedial design. The updated regional model was also used to assess this optimized groundwater extraction and treatment design for potential saltwater intrusion. The ensembles of parameters from history matching provided a platform to evaluate capture by water supply and remedial wells using particle tracking techniques. Using the ensemble to select a risk stance, multi-objective optimization was performed to identify various configurations of remedial pumping that were consistent with external constraints and favor potentially competing objectives. Multiple solutions provide tradeoffs that NYSDEC can consider. In general, pumping redistribution may help to prevent further contamination migration downgradient. These and other results are intended to support decisions for the remedial design focused on the local area encompassing the full extent of the groundwater plumes. https://pubs.usgs.gov/sir/2024/5086/sir20245086.pdf

A CASE STUDY - SUB-SLAB VAPOUR INTRUSION MITIGATION SYSTEM
Schlaefli, F. | SMART Remediation, 30 January, Ottawa, 26 slides, 2025

Design of a large-scale soil vapor intrusion mitigation system (SVIMS) was completed for a proposed building planned for construction in an area with potential for vapor intrusion (VI) in Ontario, Canada. A preliminary evaluation included feasibility and cost analysis of multiple SVIMS alternatives. The design and specification package included design calculations, detailed design drawings, specifications for SVIMS installation, QA/QC protocols for inspecting the installation, a final performance evaluation, system commissioning and associated operations, maintenance, and monitoring plans. The SVIMS, consisting of a vapor membrane, collection system, and venting system, covered the entire building footprint, measuring 25,000 m2 (270,000 ft²). The membrane consisted of a base layer HDPE membrane, a 60 mil (1.2 mm) thick layer of spray-on chemical-resistant membrane, and a protective HDPE layer, which would normally be bonded to the concrete to be poured directly above. The system was selected for its vapor performance and its strength and resistance against punctures. The vapor collection system consisted of ~2,000 linear m (21,500 linear ft) of slotted soil vapor collection pipe embedded in a layer of gravel. The vapor venting system consisted of 6 soil vapor extraction points connected to 6 inline fans venting to the atmosphere at the roof. The project was completed in 3 months and is one of the largest commercial SVIMSs in Canada. After commissioning, monitoring of the indoor air quality is ongoing, and no exceedances to the applicable indoor criteria have been identified. The indoor air results conclude that the SVIMS is performing as designed, and the risk to human health via vapor inhalation pathway has been mitigated. A reduction in the sampling frequency and scope was adopted due to the robustness and performance of the SVIMS.
https://smartremediation.com/wp-content/uploads/2025/02/SMART-Toronto-2025-Frank-Schlaefli.pdf

METAL REMOVAL BY TWO CONSTRUCTED WETLANDS IN THE SOUTHEASTERN US: IMPLICATIONS ON METAL REMEDIATION
Lindelien, C.M., X. Xu, and E. Peck. Ecological Engineering 201:107210(2024)

The influences of biogeochemical factors on the Cu and Zn removal process were evaluated in the Unmaintained A-01 wetland treatment system (WTS) and the Maintained H-02 WTS, constructed in 2000 and 2007, respectively. Surface water, sediment, sediment pore water, and giant bulrush were analyzed for metal concentrations, water and pore water chemistry parameters, and sediment bulk density. Metal speciation was estimated using Diffusive Gradients in Thin Films (DGTs) and geochemical models. Multiple linear regression models were used to explore primary parameters determining metal deposition and stability in sediment. A significant decreasing trend was observed in the surface water of both WTSs, demonstrating successful metal remediation with relatively high efficiencies (56-86%). Only the Maintained WTS presents a clear decreasing trend of metals in the sediment, likely due to the faster water flow and reduced retention time in the Unmaintained WTS that prevented sufficient metal precipitation, the observed low pH increased metal ion solubility, and reduced metal removal from the water column. A reduction in pH as waters moved through the WTS was also observed in the Maintained WTS. During wetland aging, erosion was evident in the Unmaintained WTS, as indicated by the bulk density of measured sediment layers. The pore water quality in the Unmaintained WTS had, on average, lower pH, higher oxidation-reduction potential (ORP), lower sulfate, and lower dissolved organic carbon concentrations than the Maintained WTS, leading to low activities of sulfate-reducing bacteria in producing sulfide and removing metal ions. The MLR model demonstrates metal deposition in the sediment of the Unmaintained WTS was best explained with multiple parameters, including season. The Maintained WTS was best explained by the sediment layer and the interaction between sulfide concentration with layer, implying this system relied on the settling of metals out of the surface waters and accumulation of metals in organic-rich surface sediment. Seasonal differences were observed for water temperature, ORP, DGT-measured bioavailable/labile metal concentrations, sulfide concentration in pore waters, and metals assimilated by the roots of giant bulrush.

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Demonstrations / Feasibility Studies

TREATING PFAS: LESSONS LEARNED AND THE EVOLUTION OF HIGH-PRESSURE IN SITU INJECTION OF FLUORO-SORB
Pizarro, D., M. Geary, M. Brandon, and M. Mazzarese.
SMART Remediation, 30 January, Ottawa, 29 slides, 2025

This presentation discusses the deployment of FLUORO-SORB via injection techniques as a demonstration to prove the injectability of this technology for PFAS sequestration. Bench scale and university testing compared FLUORO-SORB with ion exchange resin (IX), GAC, and biochar. In addition, competitive adsorption was tested with co-contaminants such as CVOCs and petroleum hydrocarbons. Overburden slurry injections of FLUORO-SORB can be completed using direct-push technology and highly specialized slurry batching and injection equipment. A dosing calculation tool was also developed to allow for accurate project cost estimation. The presentation focused on a comparison of historical methodologies with recent improvements to in situ remediation techniques and approaches to overburden, transition zone/saprolite, and consolidated lithologies. Improvements to overburden injection methodologies and the use of highly flexible overburden remediation units (high pressure/high flow) combined with unique downhole tooling and field installation protocols to allow expert installation of this injectate are also discussed. A field-scale demonstration study illustrates the development-focused surgical in situ remediation techniques and discusses quantified high-density CSMs for success in the field. Lessons learned and relevant data related to sorption chemistry and installation are also presented.
https://smartremediation.com/wp-content/uploads/2025/02/SMART-Toronto_Ottawa-2025-Matt-Geary.pdf

EVOLUTION OF IN-SITU THERMAL-ENHANCED OXIDATIVE REMEDIATION MONITORED BY INDUCED POLARIZATION TOMOGRAPHY
Xia, T., J. Zhang, M. Li, D. Jougnot, K. Yang, S. Li, and D. Mao.
Journal of Hydrology 648:132464(2024)

Induced polarization (IP) tomograms were applied to monitor in situ chemical oxidation coupled with thermal desorption at a field-scale NAPL-contaminated site. The site was divided into horizontal and vertical heating areas to compare the effectiveness of contaminant removal by different heating strategies. Remediation lasted 25 days, including heating (days 1-14) and injection (days 15-25) stages. Variations in IP parameters shown in the tomograms correlate with temperature, groundwater level, oxidant transport, and NAPL removal. The resulting IP tomograms during heating revealed that continued heating of horizontal tubes and groundwater decline were dominant in IP variations within the horizontal heating area, whereas temperature increased NAPL removal. The contaminant concentration during the heating stage was calculated based on variations in chargeability under stable groundwater level conditions, which facilitated the assessment of contaminant removal during heating. Contaminant consumption with oxidant transport decreased resistivity and chargeability for two heating areas during the injection process. After stopping injection, there were large changes at shallow depths at 1-5 m bgs and modest changes at depths > 6 m bgs, indicating that the oxidant migrated downwards under density-driven transport. Results demonstrate that an IP survey combined with hydrogeological parameters and geochemical measurements is suitable for quantifying contaminants removed during heating and identifying the migration pathway of the injected oxidant.

IN SITU BIO-ELECTROCHEMICAL REMEDIATION OF MTBE-CONTAMINATED GROUNDWATER AT A FUEL STATION IN CHINA
Zheng, Y., H. Shan, S. Jin, Q. Wang, M. Arslan, D. Wang, L. Chen, K. Jin, M.G. El-Din, and C. Chen. | Environmental Technology & Innovation 37:104033(2025)

A study focused on MTBE-contaminated groundwater at a fuel station in Beijing, China, where previous remediation was unsuccessful. The work field-tested a novel bioelectrochemical system (BES) and showcased a "microbial electrochemical snorkel" (MES) mechanism for enhanced in situ biodegradation of MTBE in groundwater. MTBE concentrations ranging from 8.9 μg/L-41.900 μg/L were effectively biodegraded (up to 97.4 %) in an anaerobic environment within 6 months. Enhanced biodegradation of petroleum hydrocarbon compounds and the generation of MTBE biodegradation intermediates were also observed. Data on the electrical parameters demonstrated the correlation of BES systems. Redundancy analysis showed that BES shifted microbial communities from contaminant-positive correlations to degradation/product-positive correlations. Gene expression analysis indicated that BES enhanced metabolic pathways for biodegradation and upregulated the expression of specific monooxygenases in anaerobic groundwater. Findings demonstrate a robust aerobic-like biodegradation in the anaerobic matrix when the MES mechanism establishes an alternative electron transfer pathway. This facilitates a robust biodegradation of MTBE that would have been otherwise sluggish in an anaerobic matrix.

PILOT-SCALE EVALUATION OF AN EFFICIENT SALT-FREE IN-SITU MICROEMULSION FOR THE REMEDIATION OF MULTIPLE HALOGENATED HYDROCARBONS-CONTAMINATED AQUIFERS
Yao, Y., Y. Fu, Y. Zhao, N. Liu, H. Xu, D. Zhao, W. Zhao, H. Zhang, and C. Qin.
SSRN [Published online 5 February 2025 before print]

A novel salt-free Winsor Type I microemulsion that exhibits strong solubilization capacity without the expansion risk of DNAPL contamination plumes was developed and tested in a pilot-scale study. A mixture solution of 100 mM SDS and 10% 1-butanol was injected into a multiple halogenated hydrocarbon-contaminated aquifer for flushing. Winsor Type I microemulsions were shown to form spontaneously in situ during the flushing process. After 24 days of remediation, the removal efficiencies for 1,1-DCE, 1,1-DCA, cis-1,2-DCE, 1,2-DCA, and TCE exceeded 75%, and VC was completely removed. The system poses a low potential risk for secondary contamination due to the absence of salt additives and the relatively low dosage of reagents. The pilot demonstration provided a highly efficient flushing technology and strategy for the remediation of DNAPL-contaminated groundwater. *See the pre-print non peer-reviewed version at* https://papers.ssrn.com/sol3/Delivery.cfm/dd17c527-9308-4d55-91ed-3a524701ad9a-MECA.pdf?abstractid=5125239&mirid=1&type=2

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Research

COAL ASH BENEFICIAL USE AT SAVANNAH RIVER SITE
McCaslin, E.R. Savannah River National Laboratory report SRNL-STI-2024-00462, 23 pp, 2025

The Savannah River Site (SRS) has over 1.4 million m3 of coal ash and coal fines left over from coal-burning power plants that operated onsite. Currently, the coal ash must be disposed of in an approved landfill, or the coal ash-containing basins must be closed in place (consolidation, appropriate cover, and liner system). Potential beneficial uses of the coal ash include geotechnical fill, such as backfill needed in the closure cap of the Z-area Saltstone Disposal Units (SDU) and use in cementitious material applications (thermal beneficiation or cement kiln feed), thereby reducing the environmental footprint of SRS. Coal ash samples from SRS were obtained and characterized for chemical and physical properties. Since the coal ash samples did not leach sulfates or heavy metals, it is a candidate for geotechnical fill use. The samples also did not increase the acidity of the leachate during leaching tests and would not be detrimental to use as geotechnical fill near cementitious materials. The composition and energy potential of the coal ash make it favorable for use as feed for external/off-site cement kilns or thermal beneficiation plants. https://www.osti.gov/servlets/purl/2502006

ELECTROTHERMAL MINERALIZATION OF PER- AND POLYFLUOROALKYL SUBSTANCES FOR SOIL REMEDIATION
Cheng, Y., B. Deng, P. Scotland, L. Eddy, A. Hassan, B. Wang, K.J. Silva, B. Li, K.M. Wyss, M.G. Ucak-Astarlioglu, J. Chen, Q. Liu, T. Si, S. Xu, X. Gao, K. JeBailey, D. Jana, M.A. Torres, M.S. Wong, B.I. Yakobson, C. Griggs, M. A. McCary, Y. Zhao, and J.M. Tour

Nature Communications 15:6117(2024)

A rapid electrothermal mineralization (REM) process was developed to remediate PFAS-contaminated soil. With environmentally compatible biochar as the conductive additive, the soil temperature increases to >1000°C within seconds by current pulse input, converting PFAS to calcium fluoride with inherent calcium compounds in soil. This process is able to remediate various PFAS contaminants in soil with high removal efficiencies (>99%) and mineralization ratios (>90%). REM facilitates an increase of exchangeable nutrient supply and arthropod survival in soil while retaining soil particle size, composition, water infiltration rate, and cation exchange capacity. REM is scaled up to remediate soil at 2 kg/batch and promising for large-scale, onsite soil remediation. Life-cycle assessment and techno-economic analysis demonstrate REM as an environmentally friendly and economic process, with a significant reduction of energy consumption, greenhouse gas emission, water consumption, and operation cost, when compared to existing soil remediation practices. https://www.nature.com/articles/s41467-024-49809-6.pdf

ECOLOGICAL RISK OF PER-AND POLYFLUORINATED ALKYL SUBSTANCES IN THE PHYTOREMEDIATION PROCESS: A CASE STUDY FOR ECOLOGICALLY KEYSTONE SPECIES ACROSS TWO GENERATIONS

Gang, D., H. Jia, H. Ji, J. Li, H. Yu, C. Hu, and J. Qu.
Science of The Total Environment 949:174961(2024)

A study investigated the distribution and ecotoxicological effects of PFAS on the structure and function of water-macrophyte-sediment microcosm systems. Among the system, 63%-73.1% PFOA was found in sediments and submerged plants; however, 52.5%-53% of PFPeA and 47%-47.5% of PFBS remained in the water under different treatments. PFOA was more bioavailable than the other substances, as demonstrated by the bioaccumulation factors (BAF) with ranges exposed to PFPeA and PFBS. Bioaccumulation of PFAS induced plant oxidative stress, generating enzymes to suppress superoxide and disturbing lysine biosynthesis, in which allysine, meso-2,6-diaminoheptanedioate, and Nsuccinyl-2-amino-6-ketopimelate were downregulated. PFAS were detected in the propagator (turions) of an ecological restoration species, where short-chain PFAS (70.1 % and 45.7 % for 2 or 20 μg/L PFAS exposure, respectively) spread into new individuals and influenced ecological processes shaping populations. PFAS significantly enhanced the number of microbial species in the sediment, but the degree of differentiation in the microbial community structure was not significantly different.

IDENTIFICATION OF AEROBIC ETBE-DEGRADING MICROORGANISMS IN GROUNDWATER USING STABLE ISOTOPE PROBING

Nicholls, H.C.G., H.E. Mallinson, S.F. Thornton, M. Hjort, and S.A. Rolfe.
Groundwater Monitoring & Remediation 44(4):92-103(2024)

DNA-stable isotope probing (SIP) was used to identify microorganisms able to aerobically degrade ^{13}C-labeled ethyl *tert*-butyl ether (ETBE) in lab microcosms constructed with groundwater and aquifer material from an ETBE-release site. Primary ETBE degraders were identified as microorganisms in the class γ-proteobacteria, Order β-proteobacteriales, Family Burkholderiaceae, and classified as *Methylibium* and *Leptothrix*, respectively. Comparing ETBE-responsive microorganisms (those that increased in abundance after the addition of ETBE), identified by high-throughput sequencing of microcosms established from the same site, showed that only a small proportion of the ETBE-responsive organisms were primary degraders as determined by SIP. ETBE degraders were taxonomically related to microorganisms able to degrade other gasoline components but not ETBE, implying that this functionality results from acquisition of the *eth* gene cluster by these organisms. The ETBE degraders were also identified at ETBE-release sites but at low relative abundance and generally only in locations where microcosms had been established. Molecular investigations of ETBE-contaminated sites should focus on functional genes rather than specific taxa. https://ngwa.onlinelibrary.wiley.com/doi/epdf/10.1111/gwmr.12579.

BIOACCUMULATION MECHANISMS OF PERFLUOROALKYL SUBSTANCES (PFASS) IN AQUATIC ENVIRONMENTS: THEORETICAL AND EXPERIMENTAL INSIGHTS

Hu, J., X. Yang, X. Song, Y. Miao, Y. Yu, W. Xiang, M. Huang, W. Wu, K. Liang, S. Zhao, and
H. Liu. I Journal of Hazardous Materials 480:136283(2024)

Density functional theory (DFT), molecular dynamics (MD), and experiments were incorporated to analyze the partitioning pathways and to establish the structure-bioaccumulation relationship of PFAS. DFT- and MD-calculated environmental fate parameters ($Log_{PO,W}$, $Log_{PA,W}$, and diffusion coefficients) coincide with experiments at various ranges of PFAS molecules, with a correction coefficient (R^2) of 0.783. MD simulations revealed that medium or long-chain-length PFAS spontaneously aggregate into submicelles in aquatic environments, enhancing their bioaccumulation effect. Short-chain PFAS show weak aggregation but also permeate into biological membranes. Aggregating PFAS were discovered to "dissolve" into the lipid membrane matrix, owing significantly to van der Waals interactions rather than electrostatic effects. Thermodynamic analysis suggests that PFAS translocation involves spatial flips along the free energy surface. Short-chain PFAS exhibit low steric hindrance, contributing to bioaccumulation. PFAS bioaccumulation depends on chain length, further confirmed by intracellular reactive oxygen species formation and live/dead quantification in HepG2 cells.

CONTAMINANT MASS DISCHARGE ESTIMATION OF A SULFONAMIDE PLUME BY USE OF HYDRAULIC PROFILING TOOL (HPT) AND FLUORESCENCE TECHNIQUES

Lemaire, G.G., M.M. Broholm, U. Wunsch, M. Hirsch, C.F. Ottosen, B.B. Thrane, J.K. Pedersen, L. Dissing, and P.L. Bjerg. I Journal of Contaminant Hydrology 267:104422(2024)

The main objective of this study was to assess if DP logging and sampling could be used to reasonably estimate contaminant mass discharge in a large sulfonamide contaminant plume (> 1,500 m wide) compared to a more traditional approach based on monitoring wells. A Hydraulic Profiling Tool (HPT) logging with a dedicated site calibration was used to estimate the hydraulic conductivity field. The sulfonamide concentrations were inferred from the compound fluorescence properties measured by lab spectrofluorometry (λEx / λEm = 255/340 nm) and a dedicated log-log linear regression model. Results showed that HPT-derived hydraulic conductivity values were in good agreement with monitoring well results and within the order of magnitude reported in similar studies or indirect geophysical techniques. Fluorescence appears as a powerful proxy for the sulfonamide concentration levels. The contaminant mass discharge estimate from HPT and fluorescence techniques lies within a factor of 2 from the estimate by monitoring wells, with 549 [274-668] and 776 [695- 879] kg/yr, respectively. The study highlights that DP logging tools combined with indirect methods (correlation with fluorescence) could provide a relevant contaminant mass discharge estimate for some optically active substances, given that a proper calibration phase is carried out.
https://www.sciencedirect.com/science/article/pii/S0169772224001268/pdfft?md5=43c39e4f0184ca250e9de9c2b689b0e5&pid=1-s2.0-S0169772224001268-main.pdf

SINGLE-MOLECULE PROFILING OF PER- AND POLYFLUOROALKYL SUBSTANCES BY CYCLODEXTRIN MEDIATED HOST-GUEST INTERACTIONS WITHIN A BIOLOGICAL NANOPORE

Wei, X., A. Choudhary, L.Y. Wang, L. Yang, M.J. Uline, M. Tagliazucchi, Q. Wang, D. Bedrov, and C. Liu. I Science Advances 10(45):eadp8134(2024)

Selective interactions between PFAS and four cyclodextrin (CD) variants (α-, β-, γ-, and 2-hydroxypropyl-γ-CD) were investigated within an α-hemolysin nanopore. The study demonstrated that PFAS molecules can be electrochemically sensed by interacting with a γ-CD in a nanopore. HP-γ-CDs with increased steric resistance can be used to identify homologs of perfluoroalkyl carboxylic acid and perfluoroalkyl sulfonic acid families and detect common PFAS in drinking water at 0.4 to 2 ppm levels, which are further lowered to 400 ppt by sample preconcentration. Molecular dynamics simulations reveal the underlying chemical mechanism of PFAS-CD interactions. https://www.science.org/doi/epdf/10.1126/sciadv.adp8134.

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General News

PER- AND POLYFLUOROALKYL SUBSTANCES INITIAL MONITORING: A QUICK REFERENCE GUIDE

U.S. EPA Office of Water, EPA 810-F-24-049, 3 pp, 2024

This document describes initial monitoring requirements under the PFAS Rule. Primacy agencies use the initial monitoring data provided by drinking water systems to determine compliance monitoring frequency when compliance monitoring begins. https://nepis.epa.gov/Exe/ZyPDF.cgi/P101CY4U.PDF?Dockey=P101CY4U.PDF

ANAEROBIC AND AEROBIC SEQUENTIAL PROCESS, A PROMISING STRATEGY FOR BREAKING THE STAGNATE OF BIOLOGICAL REDUCTIVE DECHLORINATION— TCE BIOREMEDIATION IN THE FIELD APPLICATION

Ma, X., R. Guo, H. Song, J. Wang, Z. Yang, G. Liang, and C. Peng.
Chemosphere 372:144106(2025)

This review highlights the new anaerobic/aerobic process in TCE biodegradation and increases understanding of the complete detoxification of chlorinated hydrocarbons. The objectives are to (1) discuss the reasons why it is difficult to completely dechlorinate via reduction; (2) analyze the advantages and pathways of TCE complete detoxification through anaerobic/aerobic sequential degradation process; and (3) summarize the major bacteria and catalytic enzymes of the cDCE and VC oxidation process.

BIOCHAR AMENDMENTS FOR ENVIRONMENTAL REMEDIATION

Nidheesh, P.V., M. Vithanage, V. Sreedharan, N. Bolan, B. Gao, and A. Bhatnagar (eds.), CRC Press, Boca Raton. ISBN 9781003344803, 358 pp, 2024

This book explores the critical role of biochar in fostering a cleaner environment through its eco-friendly, cost-effective, and sustainable applications. Within 27 chapters from leading researchers worldwide, it unravels the complexities of biochar production, its characteristics, and its multifaceted roles in environmental remediation. From pilot-scale production methods to removing heavy metals and micropollutants, it comprehensively explores biochar's potential for sustainable environmental protection. The book is aimed at researchers, professionals in environmental engineering, and those passionate about environmental stewardship and seeking innovative solutions for a greener and healthier planet.

ASSESSING UV/SGM PHOTOCATALYTIC PFAS DESTRUCTION USING A LINES OF EVIDENCE APPROACH

McIntyre, H., T. Wanzek, E. Hawley, J. Merrill, R. Deeb, and M. Hart.
Groundwater Monitoring & Remediation 45(1):23-29(2025)

This article 1) provides a brief overview of a lines-of-evidence approach to demonstrate the effectiveness of PFAS remediation technologies and 2) presents a practical application to a validated PFAS treatment technology utilizing ultraviolet-activated photocatalytic silica-based granular media to filter concentrated PFAS-containing liquids and achieve PFAS destruction. A case study illustrates the application of the lines of evidence approach and summarizes work done to validate an innovative PFAS treatment technology.

COLLECTION OF SAMPLES FROM POROUS SURFACES USING MICROVACUUM TECHNIQUES FOR THE DETECTION OF MICROBIOLOGICAL AGENTS - REVISION 1.0

Chandler, J., Y. Chambers-Velarde, J. Cuddeback, E. King, E. Silvestri-Niemer, J. Archer, W. Calfee, and M. Pirhalla. EPA Office of Research and Development, EPA 600/B-23/359, 69 pp, 2025

This document provides step-by-step instructions for using a 37-mm filter cassette (mixed cellulose ester [MCE] or a polytetrafluoroethylene [PTFE] filter), air sampling pump, and micro-vacuuming techniques to collect samples from porous surfaces potentially contaminated with *Bacillus anthracis* spores. It is intended to be used in conjunction with the analytical methods listed for microbiological agents in the latest version of EPA's Selected Analytical Methods for Environmental Remediation and Recovery (SAM) document and associated online query tools for SAM hosted on the Environmental Sampling and Analysis Method Program web pages. Although recovery efficiency and performance are not known for its use with the other microbiological agents listed in SAM, it could potentially be applied for use with those agents. The instructions are applicable to collecting microbiological agents during site remediation and recovery following an intentional or accidental homeland security-related contamination incident. Information is provided on the materials and equipment needed for sample collection; sampling kit assembly; step-by-step instructions for collecting field and quality control samples; and sample packaging, storage, and transport. Information on materials, sampling kit assembly, and sample collection is provided for filter cassettes with and without manufacturer-attached nozzles.
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