Technology Innovation News Survey

Entries for December 16-31, 2022

Market/Commercialization Information

NIAGARA FALLS STORAGE SITE REMEDIATION AND SITE SERVICES (SOL)
U.S. Army Corps of Engineers (USACE), Buffalo District, Buffalo, NY
Contract Opportunities on SAM.gov, Solicitation W912P423R0002, 2023

This is a total small business set-aside under NAICS code 562910. USACE intends to award a five-year indefinite delivery/indefinite quantity (IDIQ) single award task order contract to include for remediation of the Balance of Plant (BOP) and Groundwater Operable Units (OUs) and other site services of the Niagara Falls Storage Site in Lewiston, Niagara County, New York. The site is included in the government's Formerly Utilized Sites Remedial Action Program. Expertise is required in the following areas: environmental remediation; health physics monitoring and worker safety; installation, operation, and maintenance of air monitoring systems; environmental laboratory operations; water treatment system operation and maintenance; database programming and maintenance; waste classification, manifesting and shipping; and hazardous material surveys. The contract will include a five-year ordering period in accordance with (IAW)DFARS 217.204. The IDIQ will include one remediation task order, Task Order 1, which will be a mix of firm-fixed-price and cost-plus fixed fee line items. This is a best-value acquisition. Task Order 1, remediation of BOP and OU, will be used as the basis for award. A site visit is scheduled on January 19, 2023, at 1:00 PM EST; Attendees MUST register with the Contracting Officer. Proposals are due by 3:00 PM EST on February 15, 2023.
https://sam.gov/opp/0892f151fc354e4a9365463168378dcc/view

DRAFT: USACE, KANSAS CITY UNRESTRICTED PRAC MATOC SOLICITATION
U.S. Army Corps of Engineers (USACE), Kansas City District, Kansas City, MO
Contract Opportunities on SAM.gov, Solicitation W912DQ23R3018, 2023

The U.S. Army Corps of Engineers, Kansas City District, is soliciting feedback from industry regarding the acquisition approach for a Multiple Award Task Order Contract for hazardous, toxic and radioactive waste remediation projects for both civilian and military agencies of the Federal Government under NAICS code 562910. This MATOC will support work assigned to the U.S. Army Corps of Engineers Northwestern Division and EPA Region 2. It is anticipated the solicitation will be posted in March 2023. Comments on the acquisition approach are due by 12:00 PM CST on February 10, 2023.https://sam.gov/opp/a8f450ebd4994baba68740215c9fd2a9/view

ON-CALL ENVIRONMENTAL FIELD SERVICES BPA
U.S. Department of the Army, National Guard Bureau, W7NY USPFO Activity, Rhode Island Air National Guard 143, North Kingstown, RI
Contract Opportunities on SAM.gov, Solicitation W50S9423Q0006, 2023

This is a total small business set-aside under NAICS code 562910. The Rhode Island Air National Guard (RIANG) requires an experienced environmental contractor for emergency and non-emergency on-call services to respond to hazardous and non-hazardous spills and non-hazardous waste disposal. The contractor shall respond to releases of oil and/or hazardous/non-hazardous materials at Quonset Air National Guard Base (QANGB) and North Smithfield Air National Guard Station in Rhode Island. The contractor shall also dispose of various non-hazardous wastes generated by the RIANG at a licensed Treatment, Storage, and Disposal Facility off-base in accordance with all local, state, and federal laws. The government's goal is to issue one or multiple priced Blank Purchase Agreement(s) with a one-year base period and four one-year option periods. Offers are due by 3:00 PM EST on February 15, 2023.
https://sam.gov/opp/8f89cb5a9d7c4a52a8d8a47d8dd554e5/view

EPA REMEDIAL ACTION SOURCES SOUGHT (GLNPO-RRS-II) (SRCSGT)
U.S. Environmental Protection Agency, Region 5 Contracting Office, Chicago, IL
Contract Opportunities on SAM.gov, Solicitation 68HE0523R0021, 2023

This is a sources sought notice for market research purposes only under NAICS code 562910. EPA Region 5, in Chicago, Illinois, in support of the Great Lakes National Program Office (GLNPO), is seeking interested firms capable of performing environmental dredging in Great Lakes rivers and harbors, dredged material handling of sediments, and habitat restoration work for multiple remediation projects up to a five-year period. GLNPO executes a budget of approximately $50 million per year to facilitate sediment remediation projects varied in scope between 10,000 yd3 and 500,000 yd3 of contaminated sediment per project. Responses are due by 4:30 PM EST on February 19, 2023.
https://sam.gov/opp/b1ef21a2eea14f1486ee9620179f1573/view

VA PROFESSIONAL CONSULTING SERVICES BPA (SRCSGT)
General Services Administration, Public Buildings Service, Central Office, Washington, DC
Contract Opportunities on SAM.gov, Solicitation 47PA0323R0005, 2023

This is a sources sought notice for market research purposes only under NAICS code 541330. The General Services Administration is seeking to identify Service Disabled Veteran Owned Small Businesses (SDVOSB) that possess the availability, capability and adequacy to provide Environmental Consulting Services, including National Environmental Policy Act Assessments, environmental studies, and cultural and historic preservation consultation and assessments, 541330 Engineering Services, 541611 Management and Financial Consulting, Acquisition and Grants Management Support, and Business Program and Project Management Services, and 562910 Remediation Services in support the Department of Veterans Affairs (VA) (and potentially other agencies). Responses to this Source Sought notice will be used for preliminary planning purposes. GSA's intent is to determine whether there is a likelihood of obtaining a sufficient number of competitive quotes from small businesses to warrant limiting competition to small businesses. No quotes are requested or accepted with this notice. Responses to this sources sought are due by 4:00 PM MST on February 24, 2023.
https://sam.gov/opp/6b1c8ba9c772426ba452fd3363aa887f/view

Cleanup News

AMENDMENT DELIVERY METHODOLOGY FOR PERMEABLE REACTIVE BARRIER (PRB) INSTALLATION IN CHALLENGING LITHOLOGY AT SHAW AFB
Simpson, G. I DCHWS East 2022 Spring Symposium, 30 March-1 April, Philadelphia, PA, 17 slides, 2022

The Shaw AFB, Environmental Restoration Program, has delivered several innovations, earning praise from the base leadership and the state regulatory agency. An innovative project was conducted when the leading edge of a TCE/PCE plume, that the main pump-treat-injection system could not contain, migrated 1.5 miles beyond the base boundary. A permeable reactive treatment barrier (PRB), 650 ft long, 20 ft wide, and ~30 ft thick, specifically designed to degrade chlorinated solvents, was installed about 100 feet below ground surface. The PRB was installed using the pre-drill technique GeoTap™, which used augers, air rotary or roto sonic techniques to total depth, a bentonite backfill, and direct push through the bentonite using direct push technology. Within the confines of the treatment barrier, BOS 100® aqueous slurries were injected into 130 temporary injection points, proactively intercepting and treating the plume's leading edge to prevent further uncontrolled impacts to downgradient parcels. The first semi-annual performance monitoring report recorded an average 38% reduction in TCE/PCE levels passing through the 20-year barrier. https://drive.google.com/file/d/1iu4vKXYYRpuiK1mS4IJvmcsPSIRLwvpkfG/view

THE COLLABORATIVE MONITORED NATURAL ATTENUATION (CMNA) OF SOIL AND GROUNDWATER POLLUTION IN LARGE PETROCHEMICAL ENTERPRISES: A CASE STUDY
Song. Q., Z. Xue, H. Wu, Y. Zhai, T. Lu, X. Du, J. Zheng, H. Chen, and R. Zuo.
Environmental Research 216(Part 4):114816(2022)

Collaborative monitored natural attenuation (CMNA) was measured in soil and groundwater at a large in-service petrochemical enterprise in northeast China to remediate combined contaminants and reduce environmental risks. Contaminate distribution was determined based on a detailed investigation, and targeted contaminants in soil and groundwater were screened. The spatiotemporal variations of targeted contaminants and relative microbial responses were explored during the CMNA process. CMNA efficiency at the initial stage was evaluated by calculating the natural attenuation rate constant. The targeted contaminants in soil and groundwater were 2,2',5,5'-tetrachlorobiphenyl (2,2',5,5'-TCB) and petroleum hydrocarbons (C10~C40), and 1,2-DCA, respectively. Concentrations of all targeted contaminants decreased continuously during four years of monitoring. Targeted contaminants played a dominant role in microbial species' variability in soil and groundwater, increasing the relative abundance of petroleum tolerant/biodegradation bacteria, such as Actinobacteria, Proteobacteria, and Acidobacteriota. The average natural attenuation rate constant of 2,2',5,5'-TCB, and C10~C40 in soil was 0.0012/1 and 0.0010/, respectively, meeting the screening value after four years of attenuation. The average natural attenuation rate constant of 1,2-DCA was 0.0004/d, which needs strengthening measures to improve the attenuation efficiency.

A HIGHLY SUSTAINABLE ACTIVE REMEDIAL TOOL FOR DEGRADING PETROLEUM AND CHLORINATED CONTAMINANTS, EVEN IN CLAY FORMATION
Vonde, E. REMTECH 2022: The Remediation Technologies Symposium, Banff, AB, Canada, 11-14 October. Environmental Services Association of Alberta, Edmonton, AB (Canada), 28 slides, 2022

E-Redox-O (oxidation) units were installed in groundwater wells at an active fuel station (total area of ~37,500 ft^2) in Littleton, CO, to remediate petroleum contamination. The units were installed in an array throughout the plumes and operated with zero energy input. After four months, ~93% of benzene was degraded across the site. Once the benzene was degraded to below or near the detection limits across most of the site, three E-Redox units were moved to new locations to address a newly identified plume area. Electrical voltage was generated in all E-Redox units, ranging from 30 to 180 mV, which serve as real-time monitoring of E-Redox performance and biodegradative activity in groundwater without using groundwater sampling results. The 2-yr operation substantially reduced overall benzene concentrations to below the detection limit of 0.001 mg/L. The site is currently under post-remediation monitoring for closure. In another case study, E-Redox- I (reduction) units were installed at a former dry cleaner site in Denver, CO where PCE was identified as the main COC in groundwater. The subsurface formation is clayey with low permeability, obstructing the performance of other remediation efforts, including injections of permanganate, with limited dispersion and persistence in wells. Monitoring data showed a rapid reduction of PCE from 169 mg/L to ~50 mg/L within 30 days; however, PCE concentrations fluctuated around 50-60 mg/L over 13 months. The cause was presumed to be the presence of residual permanganate in the groundwater, which interfered with the reduction of PCE by the E-Redox units. After raising the intensity of the E-Redox units, permanganate was reductively depleted, and PCE reduction resumed in most areas of the site.
Slides: https://esaa.org/wp-content/uploads/2022/11/RT22Vonde.pdf
Longer abstract: https://esaa.org/wp-content/uploads/2022/09/RT2022-program-Abstracts-24.pdf

Demonstrations / Feasibility Studies

TIME-INTEGRATIVE PASSIVE SAMPLER DESIGNED FOR PER- AND POLYFLUOROALKYL SUBSTANCES IN WATER
Edmiston, P.L. I 2022 Emerging Contaminants in the Environment Conference (ECEC22), 27-28 April, virtual, 15 minutes, 2022

Passive samplers containing mesoporous hydrophobic organosilica modified with polyethylenimine (PEI) and Cu(II) ions to add cationic adsorption sites were characterized in bench scale measurements with varying flow rate, water chemistry, and PFAS concentrations. Results demonstrated an integrative response where sampling rates were relatively unaffected by changes in salinity, ORP, pH, temperature, and the presence of humic acid. Field trials measuring PFAS concentrations in surface water and groundwater were conducted at Ellsworth and Peterson Air Force Bases. Measurements confirmed the integrative response of the samplers and showed good correlation with PFAS concentrations measured by grab sampling. Deployment strategies of the passive samplers in groundwater, surface water, and stormwater contexts are presented. https://www.youtube.com/watch?v=Nt8SqsDayd8&list=PLBCBPVHKpeNcA014ZZLcGA4xiLjzZKMA7&index=8&t=4s

CASE STUDY: NITRATE, RADON AND PFAS TREATMENT EVALUATION FOR A WATER TREATMENT PLANT
Espinal, I. I 2022 Emerging Contaminants in the Environment Conference (ECEC22), 27-28 April, virtual, 15 minutes, 2022

Sampling finished water from a drinking water treatment plant resulted in PFAS levels above the EPA health advisory limit of 70 ppt for PFOA and PFOS. This presentation provides an overview of the steps taken to evaluate treatment, including the basis of the design, treatability testing, treatment alternatives, and a full-scale pilot test plan. Existing water quality data, a sampling plan, and existing PFAS concentrations and organic co-contaminants were reviewed to provide the basis of the design. Treatability testing included reviewing lab-scale treatment models utilizing granular activated carbon (GAC) and ion exchange (IX) media to assess PFAS removal in drinking water. Lessons learned in testing media and how co-contaminants may impact media selection and disposal were also considered. A discussion of treatment alternatives outlined process design options involving IX and GAC technologies to determine the most efficient media based on empty bed contact times, time to breakthrough, cost estimate, overall footprint, the sum of PFOA and PFOS combined concentrations, and compatibility and reconfiguration with the existing treatment process. A discussion of the pilot test plan explains how testing multiple breakthrough targets for PFOA and PFOS allowed for maximized life of the resin and the ability to make adjustments for PFAS regulatory changes. https://www.youtube.com/watch?v=EYt_ddnpn9U&list=PLBCBPVHKpeNcA014ZZLcGA4xiLjzZKMA7&index=10

SUSTAINABLE REMEDIATION PRACTICE: A FIRST CASE STUDY IN POLAND
Gzyl, G. and P. Bardos. I Remedy for Contaminated Sites Conference, 28 September, Warsaw, Poland, 15 minutes, 2022

Sustainability-based decision-making under the ISO standard, ISO 18504:2017, was applied to a remediation project in Poland. The Jaworzno landfill in the Wąwolnica stream valley is one of the largest ecological bombs in Poland and is listed as one of the major hotspots for the Baltic Sea. The Central Waste Dump and the three waste collection areas in the Rudna Gora sand mining site included >195,000 tonnes of post-production waste from chemical plants, including a large volume of lindane production residues from 1965-1982, and > 3,000 tonnes per year from the Organika-Azot S.A. Chemical Plant. Given that the lindane dump as a source is not treatable, ensuring water protection from lindane production residues in leachates from the site is critically important. A recent remediation concept proposed several remediation treatments in a mosaic to isolate the lindane sources through pathway management. A pilot that integrates in situ and wetland systems to treat polluted water from one of the existing drainage trenches from the disposal area is being conducted. The study will serve as a proof-of-concept for using a full Wetland+ as a polishing stage to treat the water output from the planned remediation technologies. Another option being considered is to direct the water to an existing but aging wastewater treatment plant.
https://www.youtube.com/watch?v=C6mp5lbQ2zs

FRAMEWORK FOR FIELD-SCALE APPLICATION OF MOLECULAR BIOLOGICAL TOOLS TO SUPPORT NATURAL AND ENHANCED BIOREMEDIATION
Key, T.A., S.J. Sorsby, Y. Wang, andA.S. Madison.
Frontiers in Microbiology 13:958742(2022)

A framework for a field-scale application of molecular biological tools (MBTs) within a multiple lines of evidence approach is presented to promote standardization and successful implementation of bioremediation. The framework consists of three stages: (i) assessment to evaluate naturally occurring biogeochemical conditions and screen for potential applicability of bioremediation; (ii) design to define a site-specific bioremediation approach and inform amendment selection; and (iii) performance monitoring to generate data to measure or infer bioremediation progress following implementation. This framework is introduced to synthesize the complexities of environmental microbiology and guide field-scale application of MBTs to assess bioremediation potential and inform site decision-making. *This article is* ***Open Access*** *a*https://www.frontiersin.org/articles/10.3389/fmicb.2022.958742/full

Research

METABOLOME PATTERNS IDENTIFY ACTIVE DECHLORINATION IN BIOAUGMENTATION CONSORTIUM SDC-9 ™
May, A.L., Y.C. Xie, F.K. Murdoch, M.M. Michalsen, F.E. Loffler, and S.R. Campagna.
Frontiers in Microbiology 1 3:981994(2022)

A lab study monitored the metabolome of the SDC-9 bioaugmentation consortium during cDCE conversion to VC and nontoxic ethene with untargeted metabolomics using an ultra-high performance liquid chromatography-Orbitrap mass spectrometer. Analyses performed on SDC-9 cultures at different stages of the reductive dechlorination process detected ~10,000 spectral features per sample arising from water-soluble molecules with both known and unknown structures. Multivariate statistical techniques, including partial least squares-discriminate analysis, identified patterns of measurable spectral features (peak patterns) that correlated with dechlorination (in)activity. ANOVA analyses identified 18 potential biomarkers for this process. Statistical clustering of samples with these 18 features identified dechlorination activity more reliably than clustering of samples based only on chlorinated ethene concentration and Dhc 16S rRNA gene abundance data, highlighting the potential value of metabolomic workflows as an innovative site assessment and bioremediation monitoring tool. *This article is* ***Open Access*** *a*https://www.frontiersin.org/articles/10.3389/fmicb.2022.981994/full

PFOS MASS FLUX REDUCTION/MASS REMOVAL: IMPACTS OF A LOWER-PERMEABILITY SAND LENS WITHIN OTHERWISE HOMOGENEOUS SYSTEMS.

Hitzelberger, M., N.A. Khan, R.M. Mohamed, M.L. Brusseau, and K.C. Carroll.
Environmental Science & Technology 56(19):13675-13685(2022)

Two-dimensional flow cell experiments were conducted to investigate the impact of flow field heterogeneity on the transport, attenuation, and mass removal of PFOS. A simplified model heterogeneous system consisting of a lower-permeability fine sand lens was placed within a higher-permeability coarse sand matrix. Sodium chloride, pentafluorobenzoic acid, and β-cyclodextrin were used to characterize the influence of diffusive mass transfer on transport and for comparison to PFOS results. Attenuation and subsequent mass removal of the nonreactive tracers and PFOS were influenced by mass transfer between the hydraulically less accessible zone and the coarser matrix (i.e., back diffusion). A mathematical model simulated flow and transport, with the values for all input parameters determined independently. The model predictions provided good matches to the measured breakthrough curves and to plots of mass flux reductions as a function of mass removed. Results reveal the importance of molecular diffusion and pore water velocity variability even for systems with relatively minor hydraulic conductivity heterogeneity. The impacts of the diffusive mass transfer limitation were quantified using an empirical function relating reductions in contaminant mass flux (MFR) to mass removal (MR). Multi-step regression was used to quantify the observed nonlinear, multi-stage MFR/MR behavior. The MFR/MR function adequately reproduced the measured data, which suggests that the approach can be used to evaluate PFOS removal from heterogeneous media.

AEROBIC BIOAUGMENTATION TO DECREASE POLYCHLORINATED BIPHENYL (PCB) EMISSIONS FROM CONTAMINATED SEDIMENTS TO AIR
Bako, C.M., A. Martinez, J.M. Ewald, J.B.X. Hua, D.J. Ramotowski, Q. Dong, J.L. Schnoor, and T.E. Mattes.
Environmental Science & Technology 56(20):14338-14349(2022)

Experiments were conducted to determine whether bioaugmentation with Paraburkholderia xenovorans strain LB400 can mitigate PCB emissions from contaminated sediment to air. Strain LB400 was added to bioreactors containing PCB-contaminated sediment. PCB mass in the headspace and aqueous bioreactor compartments was measured using passive samplers over 35 days. Time-series measurements of all 209 PCB congeners revealed an average decrease of 57% in total PCB mass accumulated in the vapor phase of bioaugmented treatments relative to non-bioaugmented controls. A comparative congener-specific analysis revealed preferential biodegradation of lower-chlorinated PCBs (LC-PCBs) by LB400. Release of the most abundant congener (PCB 4 [2,2 '-dichlorobiphenyl]) decreased by >90%. Simulations with a PCB reactive transport model closely aligned with experimental observations. The study also evaluated the effect of the phytogenic biosurfactant saponin on PCB bioavailability and biodegradation by LB400. Time-series qPCR measurements of biphenyl dioxygenase (*bphA*) genes showed that saponin better maintained *bphA* abundance when compared to the saponin-free treatment. Findings indicate that an active population of bioaugmented, aerobic PCB-degrading microorganisms can effectively lower PCB emissions and contribute to minimizing PCB inhalation exposure in communities near PCB-contaminated sites.

DEVELOPING HYDROCARBON PRGS USING PASSIVE SAMPLING, POREWATER, AND BULK SEDIMENT
Nace, C. D. Cooke, D. Mount, R.M. Burgess, and L. Burkhard
SETAC North America, 43rd Annual Meeting, 13-17 November, Pittsburgh, PA, abstract only, 2022

EPA used sediment-pore water concentrations of 34 PAHs to derive preliminary remediation goals (PRGs) at the Newtown Creek Superfund site. PRGs were derived in accordance with EPA's 2017 guidance document "Developing Sediment Remediation Goals at Superfund Sites Based on Pore Water for the Protection of Benthic Organisms from Direct Toxicity to Non-ionic Organic Contaminants." During a baseline ecological risk assessment, 35 sediment samples were collected for evaluation using the sediment quality triad approach (SQT). While sediments with high porewater PAH (34) concentrations were toxic, dilution-based PRGs calculated from the observed KOC values led to unrealistically low bulk phase PRGs. Sediment toxicity correlated strongly with several other classes of hydrocarbon compounds (e.g., C9-C40 total petroleum hydrocarbons, C10-C28 diesel range organics, C19-C36 alkyl hydrocarbons), suggesting that several samples had toxicity attributable to alkyl hydrocarbons instead of or in addition to toxicity from PAHs. Exposure-response relationships to multiple indices of hydrocarbon contamination yielded PRG values that effectively parsed toxic and nontoxic samples. EPA's 2017 porewater remediation guidance states that the method will not be suitable for all sites. In such cases, the alternate approach used for this site may allow defensible derivation of PRGs. Consequently, EPA derived PRGs for multiple hydrocarbon classes and found that combining PAH (34) and the C19-C36 fractions yielded PRGs that addressed toxicity at all 35 SQT locations.
See poster for more information: https://epa.figshare.com/articles/poster/Developing_Hydrocarbon_PRGs_Using_Passive_Sampling_Porewater_and_Bulk_Sediment/19027244

NATIONAL ASSESSMENT OF LONG-TERM GROUNDWATER RESPONSE TO PESTICIDE REGULATION
Kim, H., D.D. Voutchkova, A.R. Johnsen, C.N. Albers, L. Thorling, and B. Hansen
Environmental Science & Technology 56(20):14387-14396(2022)

Retardation time in the unsaturated zone (R_U) was estimated for the herbicides atrazine, simazine, and bentazon, and their degradation products, desethylatrazine (DEA), desisopropylatrazine (DIA), desethyldesisopropylatrazine (DEIA), and BAM using a multidecadal time series of groundwater solute chemistry (~30 years) and herbicide sales (~60 years). The sampling year was converted to a recharge year using groundwater age. Then, R_U was estimated using a cross-correlation analysis of the sales and the frequencies of detection and exceedance of each selected compound's drinking water standard (0.1 µg/L). Results showed no retardation of the highly polar, thus mobile, parent compounds (i.e., bentazon), while R_U of the moderately polar compounds (i.e., simazine) was ~ one decade, and their degradation products showed even longer R_U. The temporal trends of the degradation products did not mirror those of the sale data, which were attributed to the various sale periods of the parent compounds, sorption of the parent compounds, and complex degradation pathways. The longer R_U in clayey/organic sediments than in sandy sediments further confirmed the role of soil-specific retardation as an important factor to consider in groundwater protection.

MECHANOCHEMICALLY SULFIDATED ZERO-VALENT IRON AS PERSULFATE ACTIVATION CATALYST IN PERMEABLE REACTIVE BARRIERS FOR GROUNDWATER REMEDIATION - A FEASIBILITY STUDY
Yin, Z., G. Cagnetta, and J. Huang. I Chemosphere 311(Part 2):137081(2022)

Sulfidated zero-valent iron synthesized by ball-milling and synthesized without solvents was used as a barrier filling to active persulfate and remove reduction-resistant atrazine. Preliminary batch experiments demonstrated rapid degradation. Continuous column experiments showed sulfidated iron-activated persulfate activator performed better than zero-valent iron in atrazine and byproduct removal. Optimal atrazine removal was achieved with 10% sulfidated iron packing and 9 mM persulfate at a hydraulic residence time of 6.02 h. Under such conditions, the estimated bed length of the reactive barrier for 99% atrazine removal was 8.69 cm. The morphology and surface-active species in the column demonstrated that activation of persulfate mainly occurred at the inlet of the column until the complete usage of the active species. Batch experiments with coexisting ions suggested that they have a minor influence on atrazine removal percentage, while Mg^{2+}, Ca^{2+}, CO_2^-, and HCO- significantly impacted the process's kinetics. However, analogous column experiments demonstrated that the coexisting ions negatively influence both atrazine and its byproducts. Results corroborate the potential application of persulfate-enhanced permeable reactive barriers for in situ removal of atrazine from groundwater.

General News

SUMMARY REPORT: STRATEGIC WORKSHOP ON MANAGEMENT OF PFAS IN THE ENVIRONMENT
SERDP & ESTCP Report, 90 pp, 2022

The Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP) have been funding research on PFAS for several years, to improve PFAS analytical methods and AFFF site characterization, to understand ecotoxicological effects, to develop tools for assessing the fate of PFAS in the subsurface, and to develop and validate in situ and ex situ treatment technologies. Descriptions of all projects addressing PFAS issues that have been funded under SERDP and ESTCP can be found at https://www.serdp-estcp.org/Featured-Initiatives/Per-and-Polyfluoroalkyl-Substances-PFASs. To provide strategic guidance for future research and demonstrations on management and treatment of AFFF-impacted sites, SERDP and ESTCP conducted a workshop on March 29-30, 2022 in Chicago, IL. The objectives of the workshop were as follows: (1) to review the current state of the science regarding PFAS in the environment; (2) to evaluate currently available and developing characterization and treatment technologies; (3) to identify research and demonstration needs to improve our ability to manage and treat PFAS effectively in the environment, ultimately reducing site management costs; and (4) to determine methods to improve the dissemination and transfer of these new technologies to the user communities.
https://serdp-estcp-storage.s3.us-gov-west-1.amazonaws.com/s3fs-public/2022-11/2022%20PFAS%20Workshop%20Summary%20Report.pdf?VersionId=QQn6tLnlZezdn7ypKtTJTCGiLYxZfuiP

DESIGN OF BIOMASS-BASED RENEWABLE MATERIALS FOR ENVIRONMENTAL REMEDIATION.
Zhang, W., P. Zhang, H. Wang, J. Li, and S.Y. Dai.
Trends in Biotechnology 40(12):1519-1534(2022)

This review systemically discusses how biotechnology has empowered biomass-derived and bioinspired materials for sustainable and cost-effective environmental remediation.

TOWARDS UNDERSTANDING FACTORS AFFECTING ARSENIC, CHROMIUM, AND VANADIUM MOBILITY IN THE SUBSURFACE
Peel, H.R., F.O. Balogun, C.A. Bowers, C.T. Miller, C.S. Obeidy, M.L. Polizzotto, S.U. Tashnia, D.S. Vinson, and O.W. Duckworth.
Water 14(22):3687(2022)

This article examines the relevant geochemical and hydrological information on the release and transport of arsenic, chromium, and vanadium and the potential challenges in developing a robust understanding of their behavior in the subsurface. The article also explores the development of geochemical models, illustrates how they can be utilized, describes the gaps in knowledge that exist in translating subsurface conditions into numerical models, and provides an outlook on future research needs and developments. *This article is* ***Open Access*** *at* https://doi.org/10.3390/w14223687

GUIDANCE ON PFAS EXPOSURE, TESTING, AND CLINICAL FOLLOW-UP
National Academies of Sciences, Engineering, and Medicine, The National Academies Press, Washington, DC, 280 pp, 2022

This report recommends that the Centers for Disease Control and Prevention (CDC) update its guidance to advise clinicians to offer PFAS blood testing to patients who are likely to have a history of elevated exposure, such as those with occupational exposures or those who live in areas known to be contaminated. If testing reveals PFAS levels associated with an increased risk of adverse effects, patients should receive regular screenings and monitoring for these and other health impacts. The report also recommends that the CDC, Agency for Toxic Substances and Disease Registry, and public health departments support clinicians by creating educational materials on PFAS exposure, potential health effects, the limitations of testing, and the benefits and harms of testing. https://nap.nationalacademies.org/read/26156/chapter/1

MODELING AND MONITORING TOOLS TO SUPPORT PASSIVE AND ACTIVE NAPL REMEDIATION APPROACHES
Stewart, L., M. Kavanaugh, M. Widdowson T. McHugh and K. Walker
SERDP & ESTCP Webinar Series, January 2023

This SERDP and ESTCP webinar focuses on DoD-funded research efforts to build upon hydrologic modeling elements necessary for strengthening DoD installation water resilience. Specifically, the investigators discuss the development and accuracy of next-generation intensity-duration-frequency curves for enhancing hydrologic design, and coupled models to support the evaluation of mission-assurance risk from disruption of water infrastructure.
https://www.serdp-estcp.org/events/details/6d98533c-dda7-48fa-8a56-d39d55450a1e/01-26-2023

BIOELECTROCHEMICAL REMEDIATION FOR THE REMOVAL OF PETROLEUM HYDROCARBON CONTAMINANTS IN SOIL
Noori, M.T., D. Thatikayala, and B. Min. I Energies 15:8457(2022)

The latest development trend in bioelectrochemical systems (BESs) for petroleum hydrocarbon (PH) bioremediation is critically analyzed and discussed in this article. It elaborates on reactor design and operational factors that affect the performance of BESs and their strategic manipulations, such as designing novel reactors to improve anodic reactions, enhancing soil physiology (electrical conductivity, mass diffusion, hydraulic conductivity), electrode modifications, operational conditions, and microbial communities, to fortify the understanding of the technology for future research. Most literature notes that the low mass diffusion condition in soil restricts the microbes from interacting with the contaminant farther to the electrodes. Therefore, more research efforts are warranted to optimize soil parameters by specific amendments, electrode modifications, optimizing experimental parameters, integrating different technologies, and conducting life cycle and life cycle cost analysis to make this technology viable for field-scale applications.
https://www.mdpi.com/1996-1073/15/22/8457/pdf

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.

Mention of non-EPA documents, presentations, or papers does not constitute a U.S. EPA endorsement of their contents, only an acknowledgment that they exist and may be relevant to the Technology Innovation News Survey audience.