Technology Innovation News Survey

Entries for October 1-15, 2023

Market/Commercialization Information

F -- JOINT BASE MCGUIRE-DIX-LAKEHURST (JBMDL) OPTIMIZED REMEDIATION CONTRACT (ORC) (SRCSGT)

U.S. Army Corps of Engineers, North Atlantic Division, Baltimore District, Baltimore, MD
Contract Opportunities on SAM.gov W912DR24R0008, 2023

This is a sources sought notice for marketing research purposes only under NAICS code 562910. The U.S. Army Corps of Engineers (USACE), Baltimore District, requests letters of interest from qualified contractors interested in performing work on the potential Optimized Remediation Contract (ORC) to support the Air Force at Joint Base McGuire-Dix-Lakehurst (JBMDL) in New Jersey. Responses to this Sources Sought announcement will be used by the Government to make appropriate acquisition decisions. Therefore, the type of set-aside decision to be issued will depend upon the capabilities of the responses to this notice. The project consists of performing environmental remediation activities, the range of which includes preparation and achievement of decision documents to select or modify remedies, maintenance of established remedies, optimization at applicable sites, and achievement of site-specific objectives to support progress to Site Closeout at 67 Installation Restoration Program sites and eight Military Munitions Response Program sites. The period of performance for this contract will be ten years. The goal of the ORC initiative is to ensure the Air Force continues to fulfill all facets of its Environmental Restoration Program (ERP) mission, while effectively and efficiently managing the program in a performance-based, results-oriented, and cost-conscious framework. The Air Force desires all sites to be cleaned up to standards that allow for the current or reasonably anticipated future land use of the property. There is no solicitation at this time. Letters of intent are due by 12:00 PM EST on November 21, 2023. https://sam.gov/opp/21f6a345be36425a8bdf0c767667fde0/view

SPE603-24-R-5X04 DFSP CHARLESTON ENVIRONMENTAL SERVICES (SRCSGT)

U.S. Department of Defense Logistics Agency, DLA Energy, Fort Belvoir, VA
Contract Opportunities on SAM.gov SPE603-24-R-5X04, 2023

This is a sources sought notice for marketing research purposes only under NAICS code 562910. The U.S. Department of Defense Logistics Agency (DLA) Energy seeks to identify small businesses that can provide environmental assessment, long-term management, and emergency response services for DLA Energy Engineering, Environmental, Property Division (DLA Energy). DLA Energy implements remedies as needed to protect human health and the environment. The goal of this effort is advancement of restoration sites to Site Closure (SC) in the most cost-effective manner. DLA Energy would like to reduce long-term environmental liabilities (ELs) and life-cycle costs (LCCs) through accelerated achievement of SC. Specifically, this notice is seeking capable businesses that are interested in performing site closure at the Defense Fuel Supply Point (DFSP) Charleston in Charleston, South Carolina. There is no solicitation at this time. Capability statements are due by 3:00 PM EST on November 28, 2023. https://sam.gov/opp/b0c7c1f495c549eaa6625a41573af7fd/view

STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM (SERDP) CORE BROAD AGENCY ANNOUNCEMENT

U.S. Army Corps of Engineers, Humphreys Engineer Center Support Activity, Alexandria, VA Contract Opportunities on SAM.gov, W912HQ24S0001, 2023

When the solicitation is released, it will be competed as a full and open competition under NAICS code 541715. The Department of Defense (DoD) Strategic Environmental Research and Development Program (SERDP) is interested in receiving pre-proposals for research focusing in the areas of Environmental Restoration, Munitions Response, Resource Conservation and Resilience, and Weapons Systems and Platforms. This notice constitutes a Broad Agency Announcement (BAA) as contemplated in Federal Acquisition Regulation (FAR) 6.102(d)(2). Readers should note that this is an announcement to declare DoD SERDP's intent to competitively fund research and development for environmental research that addresses the Statements of Need set forth in the Announcement. SERDP supports environmental research relevant to the management and mission of the DoD and supports efforts that lead to the development and application of innovative environmental technologies or methods that improve the environmental performance of DoD by improving outcomes, managing environmental risks, and/or reducing costs or time required to resolve environmental problems. There is no commitment by SERDP to make any contract awards, nor to be responsible for any costs incurred by the offeror before contract award is made. It is anticipated that multiple awards totaling approximately $10 million will be made available for projects dependent upon the quality of proposals received and availability of funds. Pre-proposals are due by 2:00 PM EST on January 9, 2024. https://sam.gov/opp/02bfea1ebc674895ad01fc20dc5bc706/view#general

STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM (SERDP) EXPLORATORY DEVELOPMENT (SEED) BROAD AGENCY ANNOUNCEMENT

U.S. Army Corps of Engineers, Humphreys Engineer Center Support Activity, Alexandria, VA Contract Opportunities on SAM.gov, Solicitation W912HQ23S0002, 2023

When the solicitation is released, it will be competed as a full and open competition under NAICS code 541715. The Department of Defense (DoD) Strategic Environmental Research and Development Program (SERDP) is interested in receiving proposals for innovative research as set forth in the Announcement of the SERDP Exploratory Development (SEED) program. This notice constitutes a Broad Agency Announcement (BAA) as contemplated in Federal Acquisition Regulation (FAR) 6.102(d)(2). Readers should note that this is an announcement to declare SERDP's intent to competitively fund research and development projects to establish proof of concept for innovative environmental technologies and methods under the following Program Areas: Environmental Restoration, Munitions Response, Resource Conservation and Resilience, and Weapons Systems and Platforms. These projects will be funded with firm fixed-price contracts at a level not to exceed the Simplified Acquisition Threshold of $250,000 in total costs; projects should be no more than approximately one year in duration. e eligible for consideration, readers wishing to respond to this announcement must submit a proposal in accordance with all instructions on the SERDP website no later than 2:00 p.m. Eastern Time on March 14, 2024. https://sam.gov/opp/45a43715392448b391b911b9e61b8546/view

Cleanup News

REMEDIATION OF CHLORINATED SOLVENTS WITH ELECTRICAL RESISTANCE HEATING (ERH) AT AN ACTIVE INDUSTRIAL SITE IN ITALY

Mori, P., J. Baldock, A. Gigliuto, M.C. Zaffaroni, and C. Marino.
Italian Journal of Groundwater 23(3):41-50(2023)

The first source treatment application in Italy using Electrical Resistance Heating (ERH) was conducted at a site where a hydraulic barrier is operating within a low-yielding aquifer not used for water supply. Implementing ERH was possible since the source zone was far from the downgradient site boundary, allowing the stringent quality standards at the boundary to be achieved within a reasonable timeframe. The ERH system recovered ~600 kg of contaminants within 8 months and achieved a reduction of contaminant concentrations in the most impacted areas >90%. In similar low-yielding aquifers, setting less stringent groundwater standards at the site boundary while protecting downgradient receptors may promote more widespread implementation of source remediation activities in Italy. https://www.acquesotterranee.net/acque/article/view/674/510

CLEAN-UP OF A HYDROCARBON SPILL WITHIN A MUNICIPAL WASTEWATER TREATMENT PLANT

Walker, K. I RemTech 2023: Remediation Technologies Symposium 2023, 11-13 October, Banff, Alberta, Canada, 27 slides, 2023

A discharge of heavy bottom oil and other oil-based sludges was detected in the collection system of the City of Regina's wastewater treatment plant. The City avoided measurable environmental impacts downstream by diverting the contaminated wastewater into an old, aerated lagoon. Initial sampling indicated that the heaviest portion of the oil settled to the bottom and was absorbed into the existing biosolids in the cell. Samples collected from the upper portion of the sludge contained total PHC (C6-C50) concentrations >20,000 mg/kg. The overall range of total PHCs ranged from 21,475 to over 50,000 mg/kg. The highest concentrations were present in the heavy-ended PHC F3 and F4 fractions. Samples showed a decrease in PHC concentrations with depth from the upper surface of the sludge. Samples were collected at 150 mm and 300 mm below the original sludge surface. Monitoring and conducting sampling was critical so that only the impacted biosolids were removed and the City would be reimbursed for the cleanup. In 2017, a 4-year expansion was completed that upgraded the project to include full biological nutrient removal. The methodologies employed to identify a solution, define the analytical requirements, select a suitable disposal location, and manage the cleanup process are outlined in the presentation.
Slides: https://esaa.org/wp-content/uploads/2023/10/RT2023Walker.pdf
Longer abstract: https://esaa.org/wp-content/uploads/2023/09/RT2023-Abstracts-38.pdf

(A) COMPREHENSIVE REMEDIAL DESIGN APPROACH TO A MULTICONTAMINANT MULTIRECEPTOR SITE

Winslow, D., B. Parekh and M. McBride. I RemTech 2023: Remediation Technologies Symposium 2023, 11-13 October, Banff, Alberta, Canada, 33 slides, 2023

An ongoing series of remedial investigations and remedial actions identified cVOCs and pesticides as the primary COCs in subsurface soil, groundwater, surface water, and sediments at a former chemical plant in Elizabeth, New Jersey, that manufactured and distributed aerosol products, and stored pesticides, solvents, and propellants in ASTs. To address upland contamination and protect sensitive receptors, a treatment train approach was proposed that consisted of DNAPL removal using large diameter casings and drilling and in situ injections at the hotspots to reduce contaminant levels in the source zone followed by MNA. Several rounds of soil and groundwater delineation were conducted to achieve the project objective due to more widespread contamination than previously reported. Additional tools were utilized, including SESOIL, SPLP analysis, and compliance averaging to develop site-specific standards, which reduced the need for further delineation. During delineation and treatability testing, an isolated zone of DNAPL was found at an adjacent property boundary. A remedial approach was designed that limited the need for support of excavation (SOE) and sloping of excavation side walls to address DNAPL cost-effectively. The approach utilized the installation of larger diameter casing and a larger diameter auger in an overlapping pattern across the DNAPL zone. DNAPL-impacted soils were then removed with the auger, and the casing was backfilled with sand and amendments before casing removal. A treatability study identified a combination of Fenton's reagent and sodium persulfate

as an effective treatment; the hydrogen peroxide mobilized the adsorbed contamination, and the sodium persulfate oxidized the desorbed fraction. Two injection events were conducted in the dissolved hot spot areas. Following the first injection, mobilization of absorbed contamination increased dissolved fractions. The second injection event resulted in an overall mass reduction of 30% dissolved cVOCs.
Slides: https://esaa.org/wp-content/uploads/2023/10/RT2023Parekh.pdf
Longer abstract: https://esaa.org/wp-content/uploads/2023/09/RT2023-Abstracts-31.pdf

Demonstrations / Feasibility Studies

THE IN SITU TREATMENT OF PFAS WITHIN POREWATER AT THE AIR-WATER INTERFACE OF A PFAS SOURCE ZONE
McGregor, R. | Remediation 33(4):265-278(2023)

A study evaluated the use of colloidal activated carbon (CAC) to treat dissolved PFAS at the air-water interface within the source zone using direct push technology and a dense injection grid that targeted the interface between the air and groundwater. PFAS within the porewater and groundwater were collected using a series of nine lysimeters installed within the vadose and saturated water columns. Six PFAS were detected in the porewater and groundwater, including PFBA, PFPeA, PFHxA, PFHpA, PFOA, and PFNA. Before treatment, detectable PFAS concentrations within the pore and groundwater. Following injection of the CAC, porewater and groundwater monitoring for PFAS was conducted ~3, 6, 9, 12, and 18 months postinjection. Results indicated that the PFAS within the porewater and groundwater at and near the air-water interface was effectively attenuated over the 1.5-year monitoring program. PFAS concentrations were below the method detection during the 18-month sampling event at concentrations of ≤55 ng/L. Examining aquifer cores in the zone of injection indicated that the total organic carbon concentration of the aquifer increased by five orders of magnitude postinjection, with 97% of the samples collected within the target injection area containing activated carbon, indicating that the CAC was successfully delivered into the source zone.

1,4-DIOXANE COMETABOLIC BIOLOGICAL TREATMENT IN A FLUIDIZED BED BIOREACTOR: BENCH- AND FULL-SCALE RESULTS
Hatton, J., T. Webster, P. Hatzinger, and R.H. Anderson.
2023 Bioremediation Symposium Proceedings, 8-11 May, Austin, TX, 19 slides, 2023

The U.S. Army Corps of Engineers (USACE) and U.S. Air Force (USAF) commissioned a study to recommend treatment technologies to treat 1-4 dioxane (1,4-D) from four small pump systems used as source control measures. 1,4-D is present in all four systems at influent concentrations ranging from 2 to 55 µg/L and is discharged to facility surface water. The action limit for 1,4-D treatment is the EPA Tapwater Regional Screening Level of 0.46 µg/L. A bench-scale test was first conducted using facility treatment system effluents that included microcosm studies and the operation of a bench-scale reactor. Results indicated two microbial cultures reduced 1,4-D concentrations to non-detectable (<0.039 ug/L) levels from two system effluent sources in less than 24 hours, indicating site water was not inhibitory to the process. Results of the bench-scale reactor test indicated effective treatment of 1,4-dioxane. A pilot-scale reactor (30 gpm) was constructed and currently treats 1,4-D using aerobic cometabolic biological treatment (CBT). CBT utilizes propane to grow biomass with enzymes capable of cometabolically degrading 1,4-D. Based on previous DoD research for other contaminants, a fluidized bed bioreactor (FBR) CBT system was identified as a fixed-film bioreactor technology applicable at the site. The FBR process selected includes the required elements for 1,4-D treatment, including propane as a biomass growth substrate and a known 1,4-dioxane degrading microorganism (ENV425). The bench-scale achieved removal rates up to 96% on groundwater containing up to 50 µg/L 1,4-D. The pilot system has removed up to 80% of 1,4-D. The presentation includes a discussion of operational experience from both the bench and pilot systems and a description of some of the challenges peculiar to cometabolic biological systems. Economic information on the biological treatment system and anticipated operations to meet treatment goals are also presented.
Slides: https://www.battelle.org/docs/default-source/hidden/2023-bio-symp-presentations/track-b/b9_1055_386_hatton_rev1.pptx.pdf?sfvrsn=b00cf0c6_3
Longer abstract: https://www.battelle.org/docs/default-source/hidden/2023-bio-symp-abstracts/386.pdf?sfvrsn=3bc5d483_3

THE ROLE OF MICROBES ON THE FATE OF PFAS IN THE ENVIRONMENT
Hellman, S., L. Mankowski, D. Chang, and T. Repas. | RemTech 2023: Remediation Technologies Symposium 2023, 11-13 October, Banff, Alberta, Canada, 32 slides, 2023

In this study, six viable candidate microbes in a PFOS/PFNA growth medium were isolated from soil and groundwater at a suspected AFFF site, where PFOS/A concentrations increase when conditions in groundwater become more aerobic (downgradient from the source). In the initial microcosm study, the isolated microbes biodegraded PFOS/A in PFOS/A-spiked tap water and site groundwater in 2 and 8 weeks; those where various bioenhancements were added had the most significant reductions with aeration. In another microcosm study, PFOS/A biodegradability was investigated using a diffusive oxygen source, oxygen supplied by a shaker table, peroxide, and aeration to assess microbe viability at each stage. This study was also performed with "stored" and "fresh" microbial stocks to assess whether other unquantified environmental parameters may play a potential role in gene expressions that may influence PFAS degradation. Under aerobic conditions and spiked systems, PFOS/A concentrations in the initial microcosm decreased by 97% and 94%, respectively. Total PFAS levels in groundwater treated with microbes+aeration and microbes alone decreased by 62% and 52%, respectively, at 2 weeks, but PFOS concentrations increased slightly (8%) due to transient biotransformation of precursors. PFOS declined by 70% at 8 weeks. The stored stock did not demonstrate PFAS reduction in 2022-23 but also did not show significant adsorption of PFAS into the biomass. A preliminary bioaugmentation field pilot study demonstrated PFOS/A degradation potential, but the kinetics of precursor biotransformation to PFOS/A may cloak ongoing PFOS and/or PFOA degradation, particularly under field conditions.
Slides: https://esaa.org/wp-content/uploads/2023/10/RT2023Hellman.pdf
Longer abstract: https://esaa.org/wp-content/uploads/2023/09/RT2023-Abstracts-7.pdf

Research

RESEARCH BRIEF 345: MODIFIED IRON PARTICLES COULD IMPROVE BIOREMEDIATION OF PFAS.
National Institute of Environmental Health Sciences, Superfund Research Program (SRP), September 2023

According to research funded by the NIEHS Superfund Research Program, iron particles coated in a nontoxic material may enhance PFAS degradation by a certain bacterium. The study could inform bioremediation efforts that harness the microbe, known as Acidimicrobium Strain A6 (A6), to clean up contaminated soil, sediments, and aquifers. Distinctive PFAS properties, such as high heat tolerance and oil resistance, stem from exceptionally stable bonds between carbon and fluorine atoms. Because PFAS resist breakdown, they can accumulate in exposed organisms and ecosystems, posing a risk to human and environmental health. Some PFAS, such as PFOA - implicated in immune and kidney problems, are particularly recalcitrant to degradation. However, prior research found that A6 can break down PFOA in contaminated wastewater. In this study, the research team sought to improve PFOA breakdown by stimulating A6 activity with iron.
https://tools.niehs.nih.gov/srp/researchbriefs/view.cfm?Brief_ID=345

CONDUCTING A CLIMATE CHANGE RESILIENCE ASSESSMENT IN SUPPORT OF REMEDY SELECTION
Shaw, L., B. Collins, C. Shewen, and J. Langlais. | RemTech 2023: Remediation Technologies Symposium 2023, 11-13 October, Banff, Alberta, Canada, 22 slides, 2023

A climate change resilience assessment (CCRA) was conducted at a community in northern Canada to identify potential risks for proposed remedial options relative to a range of anticipated changes in climate events. Results were used to define potential adaptation measures and actions for four adjacent sites with hydrocarbon impacts. The findings will support selecting remedial options resilient to projected climate change effects. The CCRA conforms to ISO 31000 Risk Management guidelines to identify and evaluate key climate risks that could affect the proposed remedial options under the current climate (past 30 years) and predicted climate change scenarios by 2050 and 2080. Nine climate events were selected with quantified data for current and future climate scenarios. Each event and time horizon was reviewed in relation to the proposed remedial options and their anticipated impacts. A resiliency rating (low, medium, or high) was assigned to each climate event, for each time horizon, and for each remedial option that considered safety (risks to members of the public/community and staff), efficacy (ability to successfully implement the remedy and the effectiveness of the remedy during the occurrence of the identified climate events), and the environment (ecosystem level consequences, such as impacts to air, water and land, and ecosystem function and service). Of the six alternatives considered, one had high resiliency, and five had moderate resiliency. The identified potential risks and proposed adaptation and mitigation measures for climate events and time horizons categorized as moderate to high risk will be incorporated into the final remedy selection and remedial design. The presentation summarizes the methodology used for the assessment, assessment findings, potential risks and adaptation measures, and lessons learned.
Slides: https://esaa.org/wp-content/uploads/2023/10/RT2023Shaw.pdf
Longer abstract: https://esaa.org/wp-content/uploads/2023/09/RT2023-Abstracts-27.pdf

CENTURIAL PERSISTENCE OF FOREVER CHEMICALS AT MILITARY FIRE TRAINING SITES
Ruyle, B.J., C.P. Thackray, C.M. Butt, D.R. LeBlanc, A.K. Tokranov, C.D. Vecitis, and E.M. Sunderland. | Environmental Science & Technology 57(21):8096-8106(2023)

The expected duration and contribution of precursor biotransformation to groundwater PFAS contamination was estimated at an AFFF-contaminated military base in Cape Cod, Massachusetts. A geochemical box model was optimized using measured PFAS concentrations from a multidecadal time series of groundwater and a soil survey in the source zone. A toolbox of analytical techniques used to reconstruct the mass budget of PFAS showed that precursors accounted for 46 ± 8% of the extractable organofluorine (a proxy for total PFAS) across years. Terminal PFAS still exceeded regulatory limits by 2000-fold decades after AFFF use ceased. Measurements and numerical modeling show that sulfonamido precursors are retained in the vadose zone, and their slow biotransformation into perfluoroalkyl sulfonates (half-life > 66 yr) sustains groundwater concentrations of PFBS and PFHxS. The estimated PFAS reservoir in the vadose zone and modeled flux into groundwater suggest PFAS contamination above regulatory guidelines will persist for centuries without remediation.

INFLUENCE OF MICROBIAL WEATHERING ON THE PARTITIONING OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) IN BIOSOLIDS
Lewis, A.J., F. Ebrahimi, E.R. McKenzie, R. Surib, and C.M. Sales.
Environmental Science: Processes & Impacts 25:415-431(2023)

A study demonstrated how microbial weathering can influence biosolids decomposition, degrade PFAS, and impact PFAS partitioning in small-scale, controlled

lab experiments. In the microbial weathering experiments, compound-specific PFAS biosolids-water partitioning coefficients (K_d) decreased, on average, 0.4 logs throughout the 91-day study, with the most rapid changes occurring during the first 10 days. The highest lipid, protein, and organic matter removal rates occurred simultaneously. Statistical analyses demonstrated that the most significant solids characteristics that impacted PFAS partitioning were organic matter, proteins, lipids, and molecular weight of organics. A multiple linear regression model was built to predict PFAS partitioning behavior in biosolids based on solid characteristics of the biosolids and PFAS characteristics with an R^2 value of 0.7391 when plotting predicted and measured log K_d. Findings reveal that microbial weathering can play a significant role in the eventual fate and transport of PFAS and their precursors from biosolids.

VADOSE ZONE SOIL FLUSHING FOR CHROMIUM REMEDIATION: A LABORATORY INVESTIGATION TO SUPPORT FIELD-SCALE APPLICATION

Szecsody, J.E., H.P. Emerson, A.R. Lawter, C.T. Resch, M.L. Rockhold, R.D. Mackley, and N.P. Qafoku | Groundwater Monitoring & Remediation 43(2):34-50(2023)

A lab study provided the technical basis to design a field soil flushing strategy for Cr(VI) in the vadose zone. Objectives were to quantify the relationship between sediment Cr(VI) and Cr(III) mass and release rates and subsequent Cr(VI) leaching; investigate different methodologies to maximize Cr(VI) leaching; and investigate methods to minimize leaching of remaining residual Cr. Characterization of Cr-contaminated sediments from the Hanford site exhibited Cr(VI) leach rates which were correlated to different Cr surface phases. Sediments with low leachable Cr(VI) (https://ngwa.onlinelibrary.wiley.com/doi/epdf/10.1111/gwmr.12570

EXPERIMENTAL STUDY OF DNAPL DISPLACEMENT BY A NEW DENSIFIED POLYMER SOLUTION AND UPSCALING PROBLEMS OF AQUEOUS POLYMER FLOW IN POROUS MEDIA

Omirbekov, S., S. Colombano, A. Alamooti, A. Batikh, M. Cochennec, Y. Amanbek, A. Ahmadi-Senichault, and H. Davarzani. | Journal of Contaminant Hydrology 252:104120(2023)

A study investigated the densification of biopolymers to develop a solution with the same density as a pollutant for DNAPL remediation. Polymer solutions and contaminants were characterized through rheometers. A 1D column filled with monodisperse glass beads was used to measure their apparent viscosity in porous media. The displacement of pollutants by biopolymers (such as xanthan gum, guar gum, and carboxymethyl cellulose) and densified solutions based on barite was investigated in the 1D porous columns. The polymer solution flow was also studied using an upscaling method based on the shear viscosity measured with a rheometer. The upscaling results were compared with the 1D column experimental outcomes. Carboxymethyl cellulose was the best densifying polymer and yielded the highest DNAPL remediation. The polymers' rheology was represented well through the Carreau rheological model. The discrepancy of apparent viscosity in porous media from polymers' shear viscosity was explained by the adsorption of polymers on pore surfaces and deposition of barite particles in a porous medium, which led to decreased permeability. The upscaling results were in good agreement with experimental outcomes at low-pressure gradients. The impact of porous media geometry on polymer flow in porous media is described in the article.

REAL-TIME MONITORING OF ORGANIC CONTAMINANT ADSORPTION IN ACTIVATED CARBON FILTERS USING SPECTRAL INDUCED POLARIZATION

Moshe, S.B. and A. Furman. | Water Research 212:118103(2023)

A study examined the applicability of spectral-induced polarization (SIP) as a real-time monitoring tool. The adsorption of anionic and cationic organic dyes to commercial-AC filter was examined using a set of breakthrough experiments combined with continuous SIP monitoring. The imaginary part of the complex electrical conductivity decreased 0.25-2.5 Hz for both dyes. During adsorption of the cationic dye, a new peak developed in the 7-40 Hz range, suggesting the dominance of surface processes that were not explained by the classic stern-layer polarization theory. The recorded imaginary conductivity values were used as a proxy for adsorbed dye concentration in the calibration process of a reactive transport model. The model confirmed that SIP can successfully be used for real-time monitoring of the dye progression through the filter.

General News

ITRC PFAS DOCUMENT UPDATE

Interstate Technology and Regulatory Council (ITRC) Website, PFAS-1, 2023

This update covers more content across multiple sections including discussions on biosolids, recent claims of PFAS use and occurrence in products, AFFF replacement and clean-out, and PFAS inhalation toxicology. Other sections of the document have also been selected for additional content, including lysimeters, health effects of AFFF, and air emissions treatment. In addition, multiple external tables have been updated, including the Regulatory Programs Summary, the Analytical Methods Tables, and the Treatment Technology Table. https://pfas-1.itrcweb.org/.

PERSISTENT CHEMICALS: DETECTING, LIMITING EXPOSURE TO, AND TREATING PFAS CONTAMINATION

U.S. Government Accountability Office, Report GAO-23-106970, 3 pp, 2023

The U.S. Government Accountability Office (GAO) released this snapshot report on actions that could be taken to better detect PFAS occurrence in water, limit PFAS exposure, treat PFAS contamination, and challenges and opportunities for PFAS assessment, detection and treatment. According to GAO, examples of how PFAS enter the environment include: Manufacturing plants: Industrial processes can discharge PFAS-containing wastewater or emit PFAS into the air; Wastewater treatment plants: Effluent discharged from plants can contain PFAS; Agricultural lands: Biosolids used as fertilizer can contain PFAS and contaminate soil and water; Military or civilian airports: PFAS-containing firefighting foams can contaminate soil and water; and Landfills: PFAS-containing products (e.g., food packaging) disposed of without proper controls can contaminate soil and water. https://www.gao.gov/products/gao-23-106970.

CLIMATE-INFLUENCED HYDROBIOGEOCHEMISTRY AND GROUNDWATER REMEDY DESIGN: A REVIEW

Warner, S.D., D. Bekele, C. Paul Nathanail, S. Chadalavada, and R. Naidu.
Remediation 33(3):187-207(2023)

The process of designing a remedy for contaminated groundwater has not commonly included climate-future, hydrologic, and biogeochemical aquifer characteristics. It also has not consistently or directly integrated or projected future hydrologic and biogeochemical effects of the human-induced or developed environment (anthropogenic influence) on potential remedy performance. Not regularly assessing anthro-influenced hydrological (anthrohydrology) or biogeochemical characteristics (hydrobiogeochemistry) of a site and rarely accounting for future climatic shifts as design factors in remedy design may be partly due to the general practice-level view that groundwater remediation systems are seldom expected to last more than a few years (one or two decades at the most). Also, methods to reliably and quantitatively estimate site-specific, climate-future shifts in groundwater conditions using global and/or regional climate models and the resultant impacts on contaminant plume characteristics are not readily available. The article suggests that while the concept of remedy design resilience and durability, within an envelope of climate change and anthropogenic influence, has been discussed in some technical circles as a component of "sustainable remediation," direct application of these technical concepts in quantifiable terms remains rare. The design process could account for reasonable climate-induced influence on the groundwater system for a given site by incorporating the potential influence of future hydrobiogeochemical scenarios into remedy design. The scenarios could then be applied within the remedy selection process to assess performance durability under potentially changing hydrologic, biological, and chemical conditions. https://onlinelibrary.wiley.com/doi/epdf/10.1002/rem.21753

A GLANCE AT NOVEL MATERIALS, FROM THE TEXTILE WORLD TO ENVIRONMENTAL REMEDIATION

Tummino, M.L., A. Varesano, G. Copani, and C. Vineis.
Journal of Polymers and the Environment 31:2826-2854(2023)

This review describes possible adsorption, filtration, and purification capabilities of various functionalized textiles, biopolymers constituting the natural fibers (cellulose, keratin, fibroin), textile-derived active carbons, and biochar to provide a structured framework for the systemic exploitation of the remedial potential of waste textiles. The review also underlines the correlations among the type of textile materials, the physical-chemical treatments, and the characteristics influencing the performances of such materials as decontamination tools. https://link.springer.com/content/pdf/10.1007/s10924-023-02810-4.pdf

NOVEL MATERIALS FOR ENVIRONMENTAL REMEDIATION APPLICATIONS: ADSORPTION AND BEYOND

Giannakoudakis, D.A, L. Meili, and I. Anastopoulos (eds.). Elsevier. ISBN 978-0-323-91894-7, 588 pp, 2023

This book presents detailed, comprehensive coverage of novel and advanced materials that can be applied to address the pollution of natural resources in water, the air, and soil. Chapters include the characteristics of materials, basic and important physicochemical features for environmental remediation applications, routes of synthesis, recent advances in remediation media, and future perspectives.

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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