Technology Innovation News Survey

Entries for February 1-15, 2022

Market/Commercialization Information

REMEDIAL INVESTIGATIONS (RI), FEASIBILITY STUDIES (FS), DECISION DOCUMENTS, TIME CRITICAL AND NON-TIME CRITICAL REMOVAL ACTIONS (TCRA/NTCRA) FOR PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) IMPACTED SITES ARNG INSTALLATIONS, NATIONWIDE

U.S. Army Corps of Engineers (USACE), Baltimore District, Baltimore, MD
Contract Opportunities at SAM.gov, Solicitation W912DR22R0037, 2022

This is a sources sought announcement for market research purposes only under NAICS code 562910. The USACE, Baltimore District, is seeking sources with current relevant qualifications, experience, personnel and capabilities to complete Remedial Investigations/Feasibility Studies, decision documents and Time Critical Removal Action tasks at Army National Guard facilities where AFFF or other PFAS releases have occurred. The intent of this anticipated contract is to support USACE and its customers in completing these tasks at up to 100 ARNG facilities across the 54 U.S. states and territories. Given the large scope of this project, the contractor may be committed to performing several (e.g., 10-20) RI studies contemporaneously along with the other technical tasks. Capability statements are due by 11:00 PM EST on March 23, 2022. https://sam.gov/opp/b2cb86d5367d4ad1a20e685db5650914/view

COST ESTIMATING AND ASSESSMENT

Department of the Interior, Bureau of Land Management (BLM)
Contract Opportunities at SAM.gov, Solicitation DOILFBO220022, 2022

This is a sources sought announcement for market research purposes only under NAICS code 541620. The BLM is seeking sources capable of providing services to support a broad range of investigation, cleanup, remediation, and restoration needs at BLM sites. This includes sites such as abandoned mine lands, orphaned oil and gas wells, landfills and trash dumps, recreational shooting areas, and various other areas found on BLM-managed lands. The majority of the BLM efforts are anticipated to occur in Alaska, Arizona, California, Colorado, Idaho, Kansas, Montana, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. Categories of support services are expected to include Report and Document Development, Environmental Damage and Liabilities Identification, Environmental Damages and Liabilities Estimates, Cost Estimates, Inventory and Site Screenings, Data Reviews and Data Gap Analysis, Meetings, and Project Management Support. Interested parties may respond to this sources sought notice by 4:00 PM EDT on April 1, 2022, using the Microsoft form available at https://forms.office.com/g/vmvbfb6y1e. https://sam.gov/opp/29722aa3ca434187b13685759c8b8688/view

REGION 3 CERCLA ENVIRONMENTAL SERVICES

Department of Agriculture, Forest Service, Region 3
Contract Opportunities at SAM.gov, Solicitation 127EAV22R0003, 2022

When the solicitation is released, it will be competed as a total small business set-aside under NAICS code 562910. The U.S. Department of Agriculture's Forest Service-Region 3 intends to issue an RFP for site response activities for National Forests located in Arizona and New Mexico. Activities include conducting various evaluations, studies, and reports as specified in the National Contingency Plan found in 40 CFR 300 or as required by RCRA or other federal or state hazardous waste cleanup regulations. The following may be required: Phase I Environmental Site Assessments, Preliminary Assessment (PA), Site Inspection (SI), combined PA/SI, Potentially Responsible Party Search, Risk Assessment, an Engineering Evaluation/Cost Analysis, an RI/FS, or other documents required for CERCLA response actions, including enforcement support. The contractor may also be requested to implement the CERCLA site remedy in accordance with the NCP with approved work plans and decision documents. Work under this contract will be broken into the following areas: Site Assessment/Characterization, Removal Action Support, Removal Action Implementation, Remedial Action Support, Remedial Action Implementation, Enforcement Support, and Other Technical Support and Assistance. A majority of the projects will involve abandoned/inactive mine sites, shooting ranges, dumps, landfills, land adjustments and (acquisitions/conveyances). It is intended to award a multiple firm-fixed-price Indefinite Delivery Indefinite Quantity contract. https://sam.gov/opp/23697754b4e047e6a05b0d9e50fd60c2/view

2022 HEALTHY COMMUNITIES GRANT PROGRAM

Environmental Protection Agency, Funding Opportunity EPA-R1-HC-2022, 202

The Healthy Communities Grant Program is EPA NewEngland's main competitive grant program to fund work directly with communities to support EPA's mission to reduce environmental risks, protect and improve human health and improve the quality of life. The Healthy Communities Grant Program will achieve this through identifying and funding projects that:
•Target resources to benefit communities at risk [areas needing to create community resilience, environmental justice areas of potential concern, sensitive populations (e.g., children, elderly, tribes, urban and rural residents, and others at increased risk)].
• Assess, understand, and reduce environmental and human health risks.
• Increase collaboration through partnerships and community-based projects.
•Build institutional and community capacity to understand and solve environmental and human health problems.
• Achieve measurable environmental and human health benefits.
Target investment areas include Areas Needing to Create Community Resilience, Environmental Justice Areas of Potential Concern, and/or Sensitive Populations. To qualify as eligible projects under the Healthy Communities Grant Program, proposed projects must: (1) be located in and/or directly benefit one or more of the Target Investment Areas; and (2) identify how the proposed project will achieve measurable environmental and/or public health results in one or more of the Target Program Areas. The Healthy Communities Grant Program anticipates awarding ~15 cooperative agreements in 2022. Applications may be submitted for amounts up to $30,000 (or up to $40,000 for projects qualifying under the Pollution Prevention or Sustainable Materials Management Target Program Areas). Project periods may be for one or two years, starting no earlier than October 1, 2022.
https://www.grants.gov/web/grants/view-opportunity.html?oppId=338641

Cleanup News

LAUNCH READY! HIGH-RESOLUTION SITE CHARACTERIZATION AND THE EXPEDITED REMEDIATION OF A MULTI-ACRE CHLORINATED VOLATILE ORGANIC COMPOUND PLUME AT NASA'S LAUNCH COMPLEX 39B

Deprato, R.C. National Groundwater Association Outstanding Groundwater Project Awards, 17 pp, 2020

Work was conducted to restore groundwater resources and protect sensitive aquatic habitats at Launch Complex 39B (LC39B), a National Historic Site located within the John F. Kennedy Space Center. The goal of this project was to remediate cVOC impacts in groundwater with the potential to discharge to the sensitive habitat surrounding LC39B. A robust Conceptual Site Model using high-resolution site characterization was developed and used to design a multifaceted, specialized air sparge (AS) system to remediate the groundwater. The AS system was installed and optimized to achieve the Corrective Action Objectives after 2 years of operation. CVOC concentrations and mass present in the groundwater were reduced and mitigated the potential discharge of impacted groundwater to the surrounding sensitive aquatic habitat.
https://ntrs.nasa.gov/api/citations/20205002539/downloads/NGWA%20Awards%20Submittal%20REVIEW%20DOC.pdf

COMBINED REMEDY TREATMENT OF MULTI-CHEMICAL SOLVENT PLUME IN LOW PERMEABILITY CLAY

Brab, B. | 10th Annual AIPG Michigan Section Technical Workshop, 15-17 June, virtual, abstract only, 2021

A phased approach utilizing combined remedies was selected to remove contaminants, including halogenated solvents, methylisobutyl carbinol (MIBC), and NAPL in soil and groundwater at a former chemical plant. Remedies included 1) an off-site in-situ permeable reactive barrier utilizing Trap & Treat® BOS 100® to capture dissolved impacts and 2) shallow soil mixing using activated persulfate to mitigate unsaturated soil impacts. Trap & Treat® BOS 100® + ERD was utilized to mitigate saturated source mass soil and groundwater impacts and off-site sources during Phases 1 and 2. CAT 100 injections were also conducted in the source area. The presentation discusses the development of the CSM and the remedial action, including characterizing and injecting products into tighter units. Investigative efforts evolved to accommodate expansive clays during drilling and manage exposure to NAPL concentrations in the site source area soil. The use of a new and cutting-edge application of cometabolic synergy: granular activated carbon impregnated with metallic reactive iron coupled with an enhanced reductive chlorinating biological component is also discussed. Improved in-situ injection techniques were developed to increase effectiveness and installation throughout all planned phases. Site geology dictated multiple point installation to permit dissipation of injection pressure following completion of each injection interval.

HEXACHLOROCYCLOHEXANE CHEMICAL REMEDIATION OF A CONTAMINATED SITE IN ARGENTINA

Gotelli, M.J., A. Lo Balbo, G.M. Caballero, and C.A. Gotelli.Environmental Technology [Published online 23 September 2021 before print]

HCH-contaminated soil (10 g/kg average) present at three parcels in Buenos Aires, Argentina, was oxidized using sodium persulfate activated with citric acid chelated Fe(II). The in situ chemical process to remediate ~10,900 tons of soil in each parcel consisted of mechanical removal and initial mixing with 1,750 tons of sodium persulfate. The mixture was then transferred to an excavation site where 105 tons of ferrous sulfate and 35 tons of citric acid were added. The process resulted in an average chemical remediation efficiency >99.99%.

SURFACTANT ENHANCED EXTRACTION OF SOIL AND GROUNDWATER TO EXPEDITE SITE REDEVELOPMENT

Ivey, B. | REMEDy 2021, 29 September, virtual, 15 minutes, 2021

Surfactant enhanced aquifer remediation (SEAR) was selected to address coal tar NAPL emanating from the former Bacchus Marsh Gasworks and tar disposal wells into the upper aquifer, presenting risks to local groundwater irrigation users and freshwater ecosystems. The surfactant was used in various push-pull and recirculation methods to enhance coal tar recovery. After initial push-pull applications of SEAR, recirculation was established using a switched array of 4 injection wells and 4 to 6 extraction wells rotated daily. About 12 different injection wells were utilized in each coal tar NAPL plume. The mobilized NAPL and emulsified hydrocarbons were removed using a multiphase extraction technology. Wastewater treated on-site was reused to prepare surfactant solutions or reinjected as was practicable. Reinjection was conducted to optimize the surfactant plume behavior during extraction; however, the presence of ammonia limited the capacity to reinject the treated groundwater. Recovered emulsified NAPL separated from solution after ~30 minutes. The rapid emulsion breakdown was beneficial to the water treatment plant efficiency, as a small amount of hydrocarbon adsorbed to the plant's activated carbon. Coating of coal tar NAPL on the interiors of tanks and pipes was unforeseen and created challenges quantifying NAPL recovery rates. SEAR remediation was conducted for six months and resulted in the extraction of ~18% of the estimated coal tar NAPL mass. Due to the behavior of the non-ionic surfactant with coal tar, the majority of coal tar was recovered through the mobilization of NAPL globules rather than the emulsification, dissolution or volatilization of hydrocarbons.
https://www.youtube.com/watch?v=ABBW-lGzstg&t=27s

Demonstrations / Feasibility Studies

LOW CARB ISCO SITE REMEDIATION USING I-SAV© TECHNOLOGY

Dannwolf | AquaConSoil 2021, 15-17 June, virtual, abstract only, 2021

ISCO using i-SAV© technology was pilot-tested to remediate remaining PCE/TCE contamination at a site following six years of operating a pump and treat system. A total of 2.53 t of $Na_2S_2O_8$, persulfate (PS) and permanganate (PM) were injected using a direct push system in one borehole. Spatial monitoring of the artificially-generated fractures was conducted using tiltmeters. Measurements of the groundwater potential at three groundwater monitoring wells located around the injection borehole indicated that existing fissures were (re)activated and filled with reagents. A total of 25 fractures were generated, increasing the permeability of the affected area and local groundwater flow and influencing the distribution of the emplaced reagent. At least 25% of the injected PM was available in the subsoil two months after the injection. Gas generation in the monitoring wells showed that PS and/or PM were active 15 months after injection. Remediation goals in the test area were met after ~2 years of monitoring. The CO_2 footprint for the remediation of 163 kg CHC was calculated, including and excluding the PM production. During i-SAV remediation, 15.3 kg CO_2/kg CHC were produced, and 88 kg CO_2 /kg CHC were generated when the CO_2 produced during the manufacturing process of the PM was included in the calculation. The CO_2 footprint of the i-SAV remediation technology is low compared to other remediation technologies, and the overall footprint depends on the CO_2 produced during the manufacturing process of the remediation reagent.

COLLABORATIVE PILOT-SCALE EVALUATION OF GRANULAR ACTIVATED CARBON (GAC) AND ION EXCHANGE MEDIAS

FOR REMOVAL OF PFAS FROM GROUNDWATER
Redding, A., J. Guyer, R. Jaeger, S. Coleman, and C.R. Powley.
18th Annual EPA Drinking Water Workshop, 30 August-1 September, 2021

A pilot test was conducted to compare the PFAS removal performance of bituminous and sub-bituminous granular activated carbon to ion exchange media (macro-type and gel-type). The pilot study was scaled to accurately match the hydraulic loading rate and predict the full-scale performance via the bed depth-service time model. PFAS breakthrough was speciated not only on a compound by compound basis but also by the branched versus linear isomers, showing less selectivity of branched isomers by 10 for GAC and IX. Several hypotheses are proposed for this outcome, and the impact of molecular size and polar/nonpolar surface areas is discussed. The results were used to generate a cost comparison of media to guide future technology selection. *See times 35:30-1:04:22:*
https://www.youtube.com/watch?v=GfWfMUCsKXo

DIVER-LESS DEPLOYMENT SYSTEM FOR IN-SITU SEDIMENT SAMPLERS
Carilli, J., J. Guerrero, L. Hsu, J. Leather B. Chadwick, K. Markillie, and R. Adams.
Naval Information Warfare Center, Technical Document 3402, 104 pp, 2021

The Passive Push diver-less deployment system, designed to deploy and retrieve passive samplers at contaminated sediment sites, was refined and tested in San Diego Bay and Pearl Harbor. Five performance criteria were evaluated: (1) whether the sampler could deploy multiple types of passive samplers, (2) the rate of sampler deployment and retrieval, (3) the percentage of samples successfully retrieved, (4) the ability to use the system under a range of environmental conditions, and (5) that the system was qualitatively easy to use. During tests and demonstrations, the system was able to (1) accommodate multiple types of passive sampling materials, (2) install and recover samplers from ~ 20 stations per day, (3) successfully recover 80-90% of samplers, (4) deploy and recover samplers in a range of water depths, currents, and bottom types, and (5) be used easily by a small field team. The increased rate of sampler deployment and recovery and increased number of recovered samples led to the cost-effective use of this system compared to traditional diver-deployed methods. https://apps.dtic.mil/sti/pdfs/AD1126295.pdf

ENHANCED BIOREMEDIATION OF RDX AND CO-CONTAMINANTS PERCHLORATE AND NITRATE USING AN ANAEROBIC DEHALOGENATING CONSORTIUM IN A FRACTURED ROCK AQUIFER
Lorah, M.M. , E. Vogler, F.E. Gebhardt, D. Graves, and J.F. Grabowski.
Chemosphere 294:133674(2022)

Biostimulation with bioaugmentation to achieve anaerobic degradation of hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), perchlorate, and nitrate was compared in lab tests to select a bioaugmentation approach. A field pilot test was conducted in a fractured rock aquifer using the approach. Insignificant RDX, perchlorate, or nitrate reduction was observed by the native microbes in microcosms, with or without biostimulation using lactate. Tests of the RDX-degrading ability of the microbial consortium WBC-2, originally developed for dehalogenation of cVOCs, showed first-order biodegradation rate constants ranging from 0.57 to 0.90/day (half-lives 1.2 to 0.80 days). WBC-2 sustained degradation without daughter product accumulation when repeatedly amended with RDX and lactate for a year. RDX degradation began without delay in microcosms with groundwater containing perchlorate and nitrate when bioaugmented with 10% WBC-2. Slower RDX degradation occurred with 3% or 5% WBC-2 amendment, indicating a direct relation with cell density. Transient RDX daughter compounds were methylene dinitramine, MNX, and DNX. With the WBC-2 amendment, nitrate concentrations immediately decreased to near or below detection, and perchlorate degradation occurred with half-lives of 25-34 days. Single-well injection tests with WBC-2 and lactate showed that the onset of RDX degradation coincided with the onset of sulfide production, which was affected by the initial perchlorate concentration. Biodegradation rates in the pilot injection tests correlated with rates measured in the microcosms. Results support bioaugmentation using an anaerobic culture as a remedial strategy for sites contaminated with RDX, nitrate, and perchlorate.

Research

BIODEGRADATION OF CVOCS AND 1,4-DIOXANE MIXTURES BY ENGINEERED MICROBIAL COMMUNITIES
Mahendra, S., A. LaPat Polasko, I. Kwok, and R. Deeb. SERDP Project ER-2713, 39 pp, 2022

The objective of this project was to understand and apply potential treatment synergies to biodegrade multiple contaminants in source zones and distal plumes. A microbial community was formulated to simultaneously or sequentially degrade chlorinated VOCs and 1,4-dioxane across changing redox environments. 1,4-dioxane is detected as a co-occurring contaminant with chlorinated VOCs at many contaminated sites. Anaerobic biological reduction is a common remediation approach for chlorinated VOCs like TCE, though toxic intermediate daughter products such as cDCE and VC can accumulate. Aerobic cometabolism of chlorinated VOCs requires additional amendments of primary substrates. By combining anaerobic and aerobic microbes, chlorinated VOC transformation products are less likely to persist, and the technology can biodegrade contaminants aerobically.
https://www.serdp-estcp.org/content/download/54612/536291/file/ER-2713%20Final%20Report.pdf

EVALUATION OF A SOLIDIFICATION/STABILIZATION PROCESS FOR PFAS CONTAMINATED SOILS
Barth, E., J. McKernan, D. Bless, D. Cutt, S. Hartzell, and K. Dasu.
The Remplex Virtual Global Summit, 8-12 November, virtual, 25 slides, 2021

Granular activated carbon (GAC), an activated carbon-clay blend, modified clay, biochar, and an Fe-amended biochar were evaluated in a bench-scale study as potential sorbents for in situ stabilization/solidification of PFAS-contaminated soil. Cement was added as a binding agent to achieve physical solidification. Results indicated that GAC was slightly more effective than the other sorbents for a 3,000 µg/L solution containing a mixture of six PFAS analytes (500 µg/L concentration each of shorter- and longer-chain alkyl acids), and was the only sorbent further evaluated in the study. Immobilization effectiveness was evaluated on samples obtained from two sites using EPA Method 1312, Synthetic Precipitation Leaching Procedure. Adding GAC sorbent substantially reduced PFAS leachability from contaminated soil samples for most PFAS. Adding cement as a physical binding agent further decreased leachability for many PFAS compounds. Immobilization of PFAS detected in the leachate from two samples ranged from 87.1% to 99.9%. The lab results may apply to pilot or field-scale studies within a broader suite of PFAS contaminated site treatment options

currently available to address contaminated soil.
https://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=544060&Lab=CESER

COMPARING THE LEACHING BEHAVIOR OF PER- AND POLYFLUOROALKYL SUBSTANCES FROM CONTAMINATED SOILS USING STATIC AND COLUMN LEACHING TESTS

Kabiri, S., W. Tucker, D.A. Navarro, J. Braunig, K. Thompson, E.R. Knight, T.M.H. Nguyen, C. Grimison, C.M. Barnes, C.P. Higgins, J.F. Mueller, R.S. Kookana, and M.J. McLaughlin.
Environmental Science & Technology 56(1):368-378(2022)

This study evaluated the leaching and desorption of a wide range of PFASs from 12 contaminated soils using the Australian Standard Leaching Procedure (ASLP), the EPA Multiple Extraction Procedure (MEP) and Leaching Environmental Assessment Framework (LEAF). All three tests provided a similar assessment of PFAS behavior. Leaching from soil was related to C-chain lengths and functional head groups. Short-chain ($CF_2 \leq 6$) PFAS were easily desorbed and leached, while long-chain PFASs were more difficult to desorb. PFAS with a carboxylate head group leached more readily and to a greater extent than those with a sulfonate or sulfonamide head group. Leaching of long-chain PFAS was pH-dependent; leaching increased at high pH, while leaching of short-chain PFASs was less sensitive to pH. Comparing different leaching tests showed that the results using the alkaline ASLP were similar to the cumulative MEP data, and the ASLP may be more practical for routine use than the MEP. No single soil property was adequately able to describe PFAS leaching from the soils. The chemical structure of PFAS appeared to have a greater effect on leaching than soil physicochemical properties.

A COMPARISON OF THREE METHODS TO ASSESS NATURAL SOURCE ZONE DEPLETION AT PAVED FUEL RETAIL SITES

Smith, J.J., E. Benede, B. Beuthe, M. Marti, A.S. Lopez, B.W. Koons, A.J. Kirkman, L.A. Barreales, T. Grosjean, and M. Hjort.
Quarterly Journal of Engineering Geology and Hydrogeology 54(4):qjegh2021-0005(2021)

A study evaluated how concrete and asphalt pavement affected natural source zone depletion (NSZD) processes and data interpretation of soil gas concentration gradient, biogenic heat and carbon dioxide trap assessment methods. All methods demonstrated that NSZD occurred at rates within the low end of values reported for unpaved sites. However, rates varied considerably, highlighting the need to examine the conceptual site model and potential interferences for each method. Results demonstrate the viability of soil gas and temperature data collected from existing monitoring wells screened into the unsaturated zone without the need for additional, intrusive subsurface work.
https://qjegh.lyellcollection.org/content/qjegh/54/4/qjegh2021-005.full.pdf

EARLY EVIDENCE FOR COMPLEX RESISTIVITY AS A GEOPHYSICAL FIELD METHOD TO DELINEATE PFAS CONTAMINATION

Falzone, S., E. Siegenthaler, K. Keating, L. Slater, C. Schaefer, and D. Werkema.
The Remplex Virtual Global Summit, 8-12 November, virtual, 13 minutes, 2021

The potential for imaginary conductivity (s"), as measured with complex resistivity (CR) measurements, to characterize PFAS contaminated source zones was explored through a series of bench-scale experiments and field surveys. In bench-top studies, promising trends were observed in synthetic and legacy contaminated soil, indicating that s" is sensitive to the presence of PFAS contamination. Trends were also observed in soil treated to remove PFAS that further indicated sensitivity of s" to PFAS concentrations. In addition to laboratory data, early field evidence is presented, showing that CR surveys can delineate variations in PFAS concentrations associated with a legacy source zone of contamination. *View a copy of the recording at* https://www.youtube.com/watch?v=TiOmP1phFdI

SELECTIVE REMOVAL OF PHENOLIC COMPOUNDS BY PEROXYDISULFATE ACTIVATION: INHERENT ROLE OF HYDROPHOBICITY AND INTERFACE ROS

L., Xinru, Y. Liu, H. Qin, Z. Ye, X. Wei, W. Miao, D. Yang, and S. Mao.
Environmental Science & Technology 56(4):2665-2676(2022)

A novel catalyst composed of metal-organic-framework-derived Fe/Fe_3O_4 and three-dimensional reduced graphene oxide (rGOF) that can selectively oxidize phenolic compounds (PCs) based on their hydrophobicity was designed for peroxydisulfate (PDS) activation. The heterogeneous PDS activation system completely degraded hydrophobic PCs within 30 min. Investigating the hydrophobic properties of eight PCs revealed a positive correlation between PC hydrophobicity and reaction kinetics. The selective removal stems from the strong interaction between highly hydrophobic PCs and the catalyst. A mechanism investigation showed that interface reactive oxygen species trigger the degradation reaction. The study revealed that selective degradation of organic pollutants by PDS activation depends on the hydrophilic and hydrophobic properties of the pollutant and catalyst.

SEDIMENT SOURCES AND SEALED-PAVEMENT AREA DRIVE POLYCYCLIC AROMATIC HYDROCARBON AND METAL OCCURRENCE IN URBAN STREAMS

Van Metre, P.C., B.J. Mahler, S.L. Qi, A.C. Gellis, C.C. Fuller, and T.S. Schmidt.
Environmental Science & Technology 56(3):1615-1626(2022)

Pavement dust, soil, and streambed sediment in 10 urban watersheds from three U.S. regions were sampled to investigate sources of PAHs and metals in streambed sediment. A fallout-radionuclide-based sediment-source analysis was applied to quantify the pavement dust contribution to stream sediment (%dust). An area of seal-coated pavement was mapped in each watershed (%sealed) to investigate the role of coal-tar pavement sealant (CTS) as a PAH source. Median total and carbon-normalized total PAH concentrations were significantly higher in streambed sediment in the northeast (54.3 mg/kg and 2.71 mg/g OC) and southeast (5.37 mg/kg and 1.36 mg/g OC), where CTS is commonly used, than in the northwest (2.11 mg/kg and 0.071 mg/g OC), where CTS is rarely used. Generalized additive models indicated that %sealed and in some cases %dust significantly affected total PAH concentrations in streambed sediments. The %dust was a significant variable for Cu, Pb, and Zn. Findings may advance the quantitative understanding of the role of pavement dust as a source and a vector of contaminants to urban streams.

General News

APPLYING COMETABOLISM FOR TREATMENT OF TRADITIONAL AND EMERGING CONTAMINANTS AT DOD SITES
Hatzinger, P. SERDP & ESTCP Webinar Series, Webinar #146, January 2022

APPLYING COMETABOLISM FOR TREATMENT OF TRADITIONAL AND EMERGING CONTAMINANTS AT DOD SITES Hatzinger, P. SERDP & ESTCP Webinar Series, Webinar #146, January 2022 This presentation provides an overview of the fundamentals of cometabolic processes and examples of successful field applications to treat traditional and emerging contaminants. Recent lab and field studies suggest that aerobic cometabolism can be highly effective for a broad suite of traditional and emerging contaminants, including many chlorinated VOCs, 1,4-dioxane, 1,2-dibromoethane, 1,2,3-trichloropropane, and N-nitrosodimethylamine, individually or when comingled. New evidence indicates that cometabolism may be an important yet largely unrecognized component of natural attenuation of chlorinated VOCs in aquifers with varying geochemistries, including those characterized by acidic groundwater. For active treatment, cometabolism is particularly attractive at sites with initial low concentrations of contaminants and/or where the production of secondary products from anaerobic treatment approaches is undesirable.
https://www.serdp-estcp.org/Tools-and-Training/Webinar-Series/01-27-2022

COMBINED STRATEGIES TO PROMPT THE BIOLOGICAL REDUCTION OF CHLORINATED ALIPHATIC HYDROCARBONS: NEW SUSTAINABLE OPTIONS FOR BIOREMEDIATION APPLICATION
Rossi, M.M., E. Dell, L. Lorini, N. Amanat, M. Zeppilli, M. Villano, and M.P. Papini.
Bioengineering 8(8):109(2021)

Different coupling strategies are described to induce reductive dechlorination reactions, including increasing or reducing contaminant mobility and using innovative reductive power supply methods. Future approaches for a greener and more sustainable intervention are proposed, such as using bio-based materials from renewable resources intended as an alternative, long-lasting electron-donor source (e.g., polyhydroxyalkanoates from mixed microbial cultures) and a low-cost adsorbent (e.g., biochar from bio-waste). Novel bio-electrochemical systems that use electric current to stimulate biological reactions are also discussed. *This article is Open Access at*
https://www.mdpi.com/2306-5354/8/8/109/htm

BIOFILM-MEDIATED BIOREMEDIATION IS A POWERFUL TOOL FOR THE REMOVAL OF ENVIRONMENTAL POLLUTANTS
Mishra, S., Y. Huang, J. Li, X. Wu, Z. Zhou, Q. Lei, P. Bhatt, and S. Chen.
Chemosphere 294:133609(2022)

Biofilm formation in microorganisms, their regulatory mechanisms of interaction, and their importance and application as powerful bioremediation agents to biodegrade environmental pollutants, including hydrocarbons, pesticides, and heavy metals, are reviewed.

SYNERGIES IN CLIMATE MITIGATION AND ADAPTATION ACTIONS AT CONTAMINATED SITE CLEANUPS
Pachon, C. | 3rd AquaConSoil Webinar, virtual, 16 March, 51 minutes, 2021

This webinar explores the symbiotic nature of climate change resilience and climate change mitigation actions applied at contaminated land cleanups. Cleaning up contaminated land protects human health and the environment and enables communities and other stakeholders to pursue future beneficial use or reuse of sites and their natural resources for economic, environmental, and societal purposes. However, clean-up activities use energy, water, processed or raw materials, and other natural resources to achieve clean-up objectives. In recent years EPA clean-up programs have learned that we can optimize environmental performance and implement protective clean-ups that are greener by increasing our understanding of the environmental footprint and, when appropriate, taking steps to minimize that footprint. Actions EPA has taken to ensure the protectiveness of remedies and their resilience to increasing impacts of climate change are discussed. https://vimeo.com/524320879/5d15edd992

CARBONATE AQUIFERS THREATENED BY CONTAMINATION OF HAZARDOUS ANTHROPIC ACTIVITIES: CHALLENGES
Vadillo, I. and L. Ojeda
Current Opinion in Environmental Science & Health Published 1 February 2022 before print]

Recent studies on contaminants, including DNAPLs, LNAPLs, VOCs, pathogens, emerging contaminants, micro- and nanoplastics, and nanoparticles, were reviewed to increase knowledge on the distribution, transport, and biogeochemical reactions of contaminants in carbonate media. Progress should follow a methodological line, where advances must be achieved in the field of distribution of heterogeneous elements in carbonate formations and early detection and warning systems; and a scientific line, where specific studies of emerging pollutants may produce advances in the development of flow and transport models in heterogeneous and anisotropic media.

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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